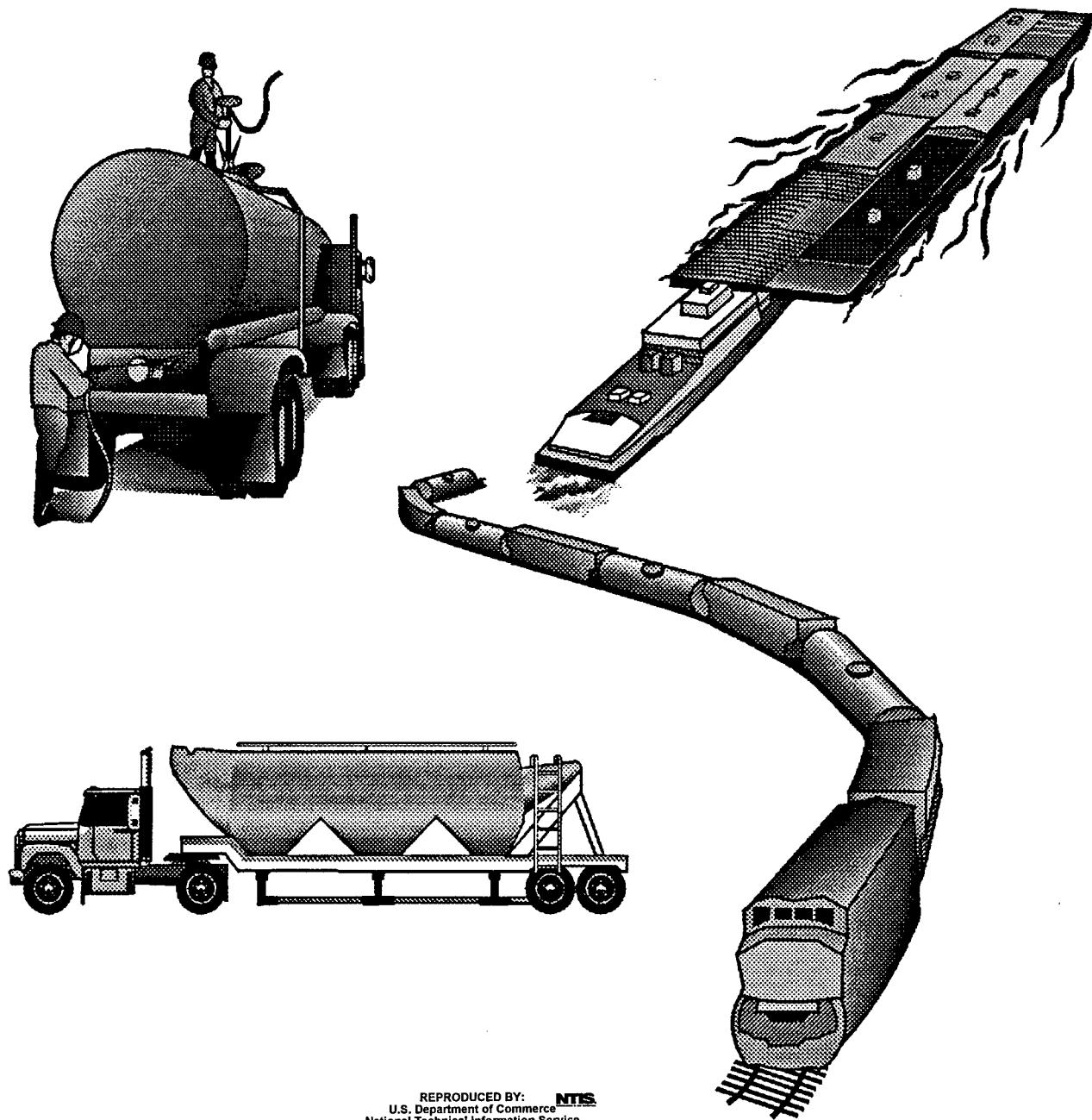




# Cost - Effectiveness Analysis Of Proposed Effluent Limitations Guidelines And Standards For The Transportation Equipment Cleaning Category



PB98-161227





# **Cost-Effectiveness Analysis of Proposed Effluent Limitations Guidelines and Standards for the Transportation Equipment Cleaning Industry Point Source Category**

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## CONTENTS

|                  | <u>Page</u>   |
|------------------|---|
| <b>SECTION 1</b> | <b>INTRODUCTION . . . . .</b>   |
| <b>SECTION 2</b> | <b>METHODOLOGY . . . . .</b>  |
| 2.1              | Selection of Pollutants Effectively Removed . . . . .     2-3           |
| 2.2              | Toxic Weighting Factors . . . . .     2-3                               |
| 2.3              | POTW Removal Factors . . . . .     2-10                                 |
| 2.4              | Pollutant Removals and Pound-Equivalent Calculations . . . . .     2-10 |
| 2.5              | Annualized Costs of Compliance . . . . .     2-12                       |
| 2.6              | Calculation of the Cost-Effectiveness Values . . . . .     2-12         |
| 2.7              | Comparison of Cost-Effectiveness Values . . . . .     2-13              |
| <b>SECTION 3</b> | <b>POLLUTION CONTROL AND MONITORING OPTIONS . . . . .</b>               |
| 3.1              | Pollution Control Options . . . . .     3-1                             |
| 3.2              | Monitoring Options . . . . .     3-1                                    |
| <b>SECTION 4</b> | <b>RESULTS OF COST-EFFECTIVENESS ANALYSIS . . . . .</b>                 |
| 4.1              | Truck Chemical . . . . .     4-1  |
| 4.2              | Rail Chemical . . . . .     4-3   |
| 4.3              | Barge Chemical and Petroleum . . . . .     4-3                          |
| 4.4              | Truck Petroleum . . . . .     4-8                                       |
| 4.5              | Rail Petroleum . . . . .     4-8  |
| 4.6              | Truck Food . . . . .     4-8  |
| 4.7              | Rail Food . . . . .     4-13  |

## CONTENTS

|  | <u>Page</u>   |
|--|---|
| 4.8      Barge Food .....                    | 4-17  |
| 4.9      Truck Hopper .....                  | 4-17  |
| 4.10     Rail Hopper .....                   | 4-17  |
| 4.11     Barge Hopper .....                  | 4-22  |
| <b>SECTION 5</b>                             | <b>COMPARISON OF COST-EFFECTIVENESS VALUES WITH<br/>PROMULGATED RULES .....</b>   |
|  | 5-1   |
| <b>SECTION 6</b>                             | <b>COST-REASONABILITY OF CONVENTIONAL<br/>POLLUTANTS REMOVED .....</b>  |
|  | 6-1   |
| 6.1      BCT Cost-Reasonableness Test .....  | 6-1   |
| 6.1.1     POTW Test .....                    | 6-1   |
| 6.1.2     Industry Ratio Test .....          | 6-2   |
| 6.2      Subcategory BCT Tests .....         | 6-2   |
| 6.2.1     Truck Food .....                   | 6-3   |
| 6.2.2     Rail Food .....                    | 6-3   |
| 6.2.3     Barge Food .....                   | 6-3   |
| 6.2.4     Truck Chemical .....               | 6-7   |
| 6.2.5     Rail Chemical .....                | 6-7   |
| 6.2.6     Barge Chemical and Petroleum ..... | 6-7   |
| 6.2.7     Barge Hopper .....                 | 6-11  |
| <b>SECTION 7</b>                             | <b>REFERENCES .....</b>   |
|  | 7-1   |
| <b>APPENDIX A</b>                            | <b>SUPPORTING DOCUMENTATION FOR COST-<br/>EFFECTIVENESS ANALYSIS: POLLUTANT LOADINGS<br/>AND POUND EQUIVALENTS REMOVED</b>              |
| <b>APPENDIX B</b>                            | <b>SUPPORTING DOCUMENTATION FOR COST-<br/>EFFECTIVENESS ANALYSIS: BASELINE POLLUTANT<br/>DISCHARGES IN POUNDS AND POUND EQUIVALENTS</b> |

## **CONTENTS**

|                   | <u>Page</u>   |
|-------------------|---|
| <b>APPENDIX C</b> | <b>SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS<br/>ANALYSIS: CONVENTIONAL POLLUTANT REMOVALS</b>                |
| <b>APPENDIX D</b> | <b>SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS<br/>ANALYSIS: BASELINE CONVENTIONAL POLLUTANT<br/>DISCHARGES</b> |



## **SECTION 1**

### **INTRODUCTION**

This cost-effectiveness analysis presents an evaluation of the technical efficiency of pollutant control options for the proposed Effluent Limitations Guidelines and Standards for the Transportation Equipment Cleaning Industry based on Best Available Technology Economically Achievable (BAT) and Pretreatment Standards for Existing Sources (PSES).<sup>1</sup> For the purposes of this analysis, the U.S. Environmental Protection Agency (EPA) has divided the Transportation Equipment Cleaning (TEC) industry into 11 subcategories on the basis of the commodity transported and the mode of transportation:

- Truck Chemical (TT/CHEM)
- Rail Chemical (RT/CHEM)
- Barge Chemical and Petroleum (TB/CHEM)<sup>2</sup>
- Truck Petroleum (TT/PETR)
- Rail Petroleum (RT/PETR)
- Truck Food (TT/FOOD)
- Rail Food (RT/FOOD)
- Barge Food (TB/FOOD)
- Truck Hopper (TH/HOPPER)

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<sup>1</sup> Best Available Technology Economically Achievable (BAT) is required under Section 304(b)(2) of the Clean Water Act. These rules control the discharge of priority and non-conventional pollutants and apply to existing industrial dischargers. Pretreatment Standards for Existing Sources (PSES) are analogous to BAT; these rules apply to indirect dischargers (whose discharges flow to publicly owned treatment works (POTWs).

<sup>2</sup> Effluent sampling found no significant difference between Barge Chemical and Barge Petroleum subcategories; therefore, these two subcategories were combined into a single Barge Chemical and Petroleum subcategory; see the Development Document (U.S. EPA, 1998b) for details.

- Rail Hopper (RH/HOPPER)
- Barge Hopper (BH/HOPPER)

In this analysis, EPA compares the total pretax annualized cost of each regulatory option to the corresponding effectiveness of that option in reducing the discharge of pollutants. EPA evaluates the effectiveness of each option in terms of costs per pound of pollutant removed, weighted by the relative toxicity of the pollutant. EPA also provides the rationale for using this measure, which is referred to as pound equivalents removed.

This cost-effectiveness analysis is based on two surveys conducted by EPA. The first, called the screener survey, listed 16 questions and was sent to 3,267 industry participants that might be affected by the rule (U.S. EPA, 1993). From the results of the screener survey, EPA identified 734 facilities with TEC operations that might be affected by the rule. These facilities formed the universe from which a stratified sample was drawn for the second survey, a detailed questionnaire (U.S. EPA, 1995).

In general, EPA estimated cost-effectiveness and economic impacts for subcategories and discharge status using data from the detailed questionnaire. Cost-effectiveness is also estimated for subcategories where certain types of dischargers are represented only by screener data. Unless otherwise specified in the text, however, cost-effectiveness is estimated on the results of the detailed questionnaire.

Section 2 discusses EPA's cost-effectiveness methodology and identifies the pollutants included in the analysis. This section also presents EPA's toxic weighting factors for each pollutant and considers the removal efficiency of each pollution control option. Section 3 describes the options evaluated for each subcategory. Section 4 presents the results of the cost-effectiveness analysis. In Section 5, cost-effectiveness values for proposed TEC industry options are compared to cost-effectiveness values for other promulgated rules. Section 6 discusses the two-part cost-reasonableness test for BCT options. Appendix A presents data on pollutants, pollutant removals, and pound equivalents removed. Appendix B presents data on pollutants discharged at baseline. Appendixes C and D present data on conventional pollutant removals and discharges, respectively.

## **SECTION 2**

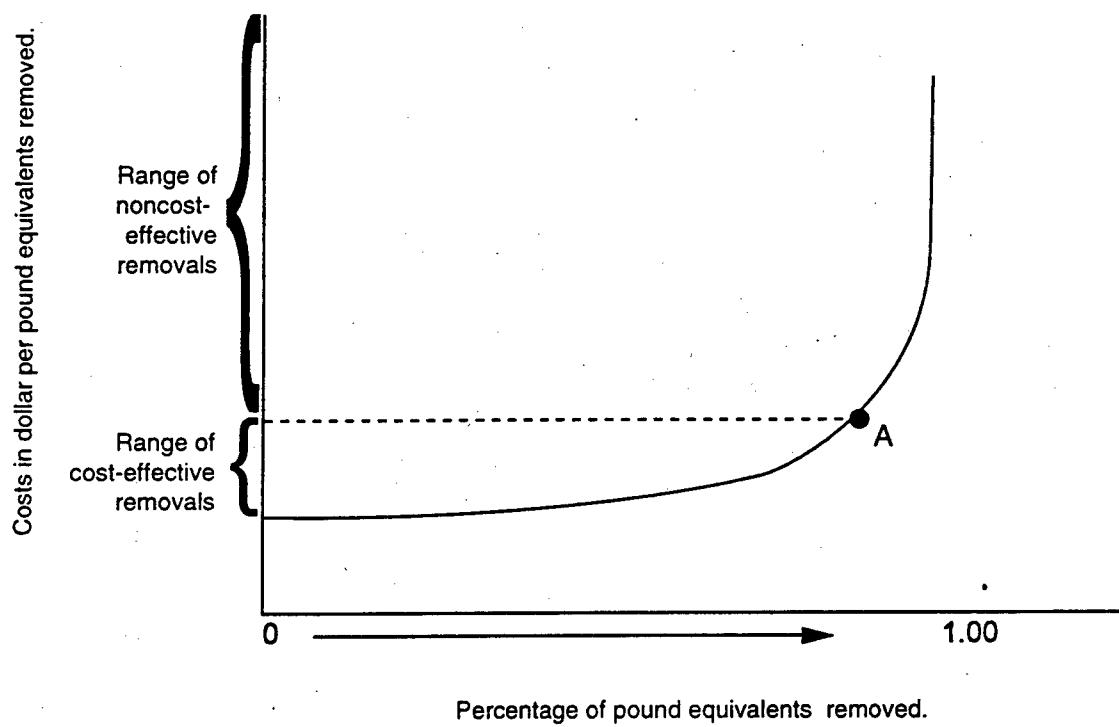
### **METHODOLOGY**

The cost-effectiveness of the TEC Industry Guidelines and Standards is evaluated as the incremental annualized cost of a pollution control option in an industry or industry subcategory per incremental pound equivalent of pollutant (i.e., pound of pollutant adjusted for toxicity) removed by that control option. EPA uses the cost-effectiveness analysis primarily to compare the removal efficiencies of regulatory options under consideration for a rule. A secondary and less effective use is to compare the cost-effectiveness of the options for the TEC Industry Guidelines and Standards to that of effluent guidelines and standards for other industries.

EPA ranks pollution control options in order of increasing pound equivalents removed in order to identify the point at which increased removal of pollutants is no longer cost-effective. Generally, EPA determines this to be where the marginal cost per pound equivalent removed increases sharply; that is, where relatively few incremental pounds are removed for steady increases in cost. Figure 2-1 shows this point as Point A, where the cost-effectiveness curve becomes nearly vertical. Increases in removals beyond Point A come only at relatively high unit costs, which, in many cases, EPA may determine exceeds the relative benefit to society.

To develop a cost-effectiveness study, the following number of steps must be taken to define the analysis or generate data used for calculating values:

- Determine the pollutants effectively removed from the wastewater
- Estimate the relative toxic weights (the adjustments to pounds of pollutants to reflect toxicity) of the pollutants effectively removed
- Estimate the POTW removal factors the adjustments to pounds of pollutant to reflect the ability of a POTW to remove specified pollutants
- Define the regulatory pollution control options
- Calculate pollutant removals for each pollution control option



**Figure 2-1. Cost effectiveness**

- Determine the annualized cost of each pollution control option

Once cost-effectiveness values are calculated, various regulatory options under consideration can be compared. The following seven sections discuss each of the six preliminary steps and the cost-effectiveness calculation and comparison methodologies.

## **2.1 SELECTION OF POLLUTANTS EFFECTIVELY REMOVED**

EPA considers several factors in selecting pollutants for regulation, including toxicity, frequency of occurrence in wastestream effluent, and amount of pollutant in the wastestream. The list of pollutants considered, therefore, differs by subcategory. Table 2-1 is a master list of the pollutants effectively removed and the subcategories in which they are considered.

## **2.2 TOXIC WEIGHTING FACTORS**

Cost-effectiveness analyses account for differences in toxicity among the pollutants using toxic weighting factors. Accounting for these differences is necessary because the potentially harmful effects on human and aquatic life are specific to the pollutant. For example, a pound of zinc in an effluent stream has a significantly different, less harmful effect than a pound of PCBs. Toxic weighting factors for pollutants are derived using ambient water quality criteria and toxicity values. For most industries, toxic weighting factors are developed from chronic freshwater aquatic criteria. In cases where a human health criterion has also been established for the consumption of fish, the sum of both the human and aquatic criteria are used to derive toxic weighting factors. The factors are standardized by relating them to a "benchmark" toxicity value, which was based on the toxicity of copper when the methodology was developed.<sup>3</sup> Table 2-1 presents the toxic weighting factors used for the regulated pollutants in this cost-effectiveness analysis.

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<sup>3</sup> Although the water quality criterion has been revised (to 12.0 µg/l), all cost-effectiveness analyses for effluent guideline regulations continue to use the former criterion of 5.6 µg/l as a benchmark so that cost-effectiveness values can continue to be compared to those for other effluent guidelines. Where copper is present in the effluent, the revised higher criterion for copper results in a toxic weighting factor for copper of 0.467 rather than 1.0.

**TABLE 2-1**  
**POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS**

| Pollutant                  | Toxic Weighting Factor (TWF) | Ref. | POTW Removal Factor | Ref. | Subcategory |               |            |      |           |          | Hopper |   |   |
|----------------------------|------------------------------|------|---------------------|------|-------------|---------------|------------|------|-----------|----------|--------|---|---|
|                            |                              |      |                     |      | Truck Tank  | Rail Tank Car | Tank Barge | Food | Petroleum | Chemical |        |   |   |
| <b>NONCONVENTIONALS</b>    |                              |      |                     |      |             |               |            |      |           |          |        |   |   |
| Total Cyanide              | 1.10E+00                     | A    | 3.00E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Fluoride                   | 3.50E-02                     | A    | 3.90E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| <b>VOLATILES</b>           |                              |      |                     |      |             |               |            |      |           |          |        |   |   |
| Acetone                    | 7.60E-06                     | A    | 1.60E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Acrylonitrile              | 8.50E-01                     | B    | 5.00E-02            | D    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Benzene                    | 1.80E-02                     | A    | 5.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Chloroform                 | 2.10E-03                     | A    | 2.70E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| 1,2-Dichloroethane         | 6.20E-03                     | A    | 1.10E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Ethylbenzene               | 1.40E-03                     | A    | 6.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Methyl ethyl ketone        | 2.20E-05                     | A    | 8.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Methyl isobutyl ketone     | 1.20E-04                     | A    | 1.20E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Methylene Chloride         | 4.20E-04                     | A    | 4.60E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Tetrachloroethylene        | 7.40E-02                     | A    | 1.50E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Toluene                    | 5.60E-03                     | A    | 4.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| 1,1,1-Trichloroethane      | 4.30E-03                     | A    | 1.00E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Trichloroethylene          | 6.30E-02                     | A    | 1.30E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Vinyl Acetate              | 4.00E-03                     | B    | 1.00E-00            | *    | X           | X             | X          | X    | X         | X        | X      | X | X |
| m-Xylene                   | 1.50E-03                     | A    | 3.50E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| o- and p-Xylene            | 8.50E-03                     | A    | 5.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| <b>SEMIVOLATILES</b>       |                              |      |                     |      |             |               |            |      |           |          |        |   |   |
| Acenaphthene               | 2.50E-01                     | A    | 2.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Acenaphthylene             | 8.40E-03                     | A    | 5.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Alpha-Terpineol            | 1.00E-03                     | A    | 5.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Anthracene                 | 2.50E+00                     | A    | 4.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| 2,3-Benzofluorene          | 2.20E-01                     | A    | 3.00E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Benzic acid                | 3.30E-04                     | A    | 1.90E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Benzyl alcohol             | 5.60E-03                     | A    | 2.20E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Biphenyl                   | 3.70E-02                     | A    | 4.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Bis(2-ethylhexyl)phthalate | 1.10E-01                     | A    | 4.00E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| Carbazole                  | 2.70E-01                     | A    | 1.00E+00            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| 4-Chloro-3-Methylphenol    | 4.30E-03                     | B    | 2.90E-01            | D    | X           | X             | X          | X    | X         | X        | X      | X | X |
| 2-Chlorophenol             | 3.30E-02                     | A    | 5.00E-02            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |
| o-Cresol                   | 3.30E-03                     | A    | 4.70E-01            | A    | X           | X             | X          | X    | X         | X        | X      | X | X |

TABLE 2-1 (continued)

## POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

| Pollutant                        | Toxic Weighting Factor (TWF) | POTW Removal Factor | Ref.     | Subcategory |          |      |           |          |      |           |          |      |       |
|----------------------------------|------------------------------|---------------------|----------|-------------|----------|------|-----------|----------|------|-----------|----------|------|-------|
|                                  |                              |                     |          | Ref.        | Chemical | Food | Petroleum | Chemical | Food | Potroleum | Chemical | Food | Truck |
| <b>SEMIVOLATILES (continued)</b> |                              |                     |          |             |          |      |           |          |      |           |          |      |       |
| p-Cresol                         | 2.40E-03                     | A                   | 2.80E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| p-Cymene                         | 4.30E-02                     | A                   | 1.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Decane                         | 4.30E-03                     | A                   | 9.10E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| 2,4-Diaminotoluene               | 1.80E-01                     | A                   | 1.00E-00 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| 1,2-Dichlorobenzene              | 1.10E-02                     | A                   | 1.10E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| 3,6-Dimethylphenanthrene         | 4.70E-01                     | A                   | 5.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Di-n-octyl phthalate             | 2.20E-01                     | A                   | 1.70E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Diphenyl Ether                   | 2.60E-02                     | B                   | 1.30E-01 | D           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Docosane                       | 8.20E-05                     | A                   | 1.20E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Dodecane                       | 4.30E-03                     | A                   | 5.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Eicosane                       | 4.30E-03                     | A                   | 8.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Fluoranthene                     | 9.20E-01                     | A                   | 5.80E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Fluorene                         | 7.00E-01                     | A                   | 3.00E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Hexacosane                     | 8.20E-05                     | A                   | 2.90E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Hexadecane                     | 4.30E-03                     | A                   | 2.90E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Hexanoic Acid                    | 3.40E-04                     | B                   | 1.60E-01 | D           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| 2-Isopropynaphthalene            | 9.80E-02                     | A                   | 7.20E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| 1-Methylfluorene                 | 8.90E-02                     | A                   | 3.00E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| 2-Methylnaphthalene              | 1.80E-02                     | A                   | 7.20E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| 1-Methylphenanthrene             | 1.40E-01                     | A                   | 5.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Naphthalene                      | 1.50E-02                     | A                   | 5.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Octacosane                     | 8.20E-05                     | A                   | 2.90E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Octadecane                     | 4.30E-03                     | A                   | 2.90E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Pentamethylbenzene               | 2.90E-01                     | A                   | 9.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Phenanthrene                     | 1.90E+01                     | A                   | 5.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Phenol                           | 2.80E-02                     | A                   | 5.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Pyrene                           | 7.50E-02                     | A                   | 5.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Styrene                          | 1.40E-02                     | A                   | 6.00E-02 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Tetracosane                    | 8.20E-05                     | A                   | 2.90E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Tetradecane                    | 4.30E-03                     | A                   | 2.90E-01 | A           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| n-Triacontane                    | 8.20E-05                     | A                   | 5.30E-01 | D           | X        | X    | X         | X        | X    | X         | X        | X    | X     |
| Tripropylene glycol Methyl Ether | 8.20E-06                     | B                   |          |             |          |      |           |          |      |           |          |      |       |

TABLE 2-1 (continued)

## POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

| Pollutant                        | Toxic Weighting Factor (TWF) | Ref. | POTW Removal Factor | Ref. | Subcategory |      |           |          | Hopper        |           |          |      |       |
|----------------------------------|------------------------------|------|---------------------|------|-------------|------|-----------|----------|---------------|-----------|----------|------|-------|
|                                  |                              |      |                     |      | Truck Tank  |      |           |          | Rail Tank Car |           |          |      |       |
|                                  |                              |      |                     |      | Chemical    | Food | Petroleum | Chemical | Food          | Petroleum | Chemical | Food | Barge |
| <b>PESTICIDES</b>                |                              |      |                     |      |             |      |           |          |               |           |          |      |       |
| Azinphos ethyl                   | 5.10E+03                     | G    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      |       |
| Azinphos methyl \ methyl-Guthion | 2.80E+01                     | A    | 2.60E-01            | A    | X           |      |           |          |               |           |          |      |       |
| Coumaphos                        | 5.50E+03                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      |       |
| Dichlofenthion                   | 1.40E+01                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      |       |
| Diazathion                       | 6.20E+01                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Disulfoton                       | 1.20E+02                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      |       |
| EPN \ Santox                     | 7.60E+02                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      |       |
| Lepiofipos                       | 1.10E+01                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      |       |
| Merphos \ Folex                  | 2.50E+01                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      |       |
| Tetrachlorvinphos                | 1.40E-01                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      |       |
| Tetukthion                       | 9.30E-03                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Trichoforon                      | 7.00E+02                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Trichloronate                    | 5.60E+03                     | B    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Trimethylphosphate               | 1.90E-03                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Acephate                         | 1.30E-02                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      | X     |
| Alachlor                         | 1.60E-02                     | A    | 1.00E+00            | E    | X           |      |           |          |               |           |          |      | X     |
| Atrazine                         | 9.40E-02                     | A    | 5.80E-01            | A    | X           |      |           |          |               |           |          |      | X     |
| Benefluralin                     | 1.60E-01                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      | X     |
| alpha-BHC                        | 4.30E+01                     | A    | 3.60E-01            | A    | X           |      |           |          |               |           |          |      | X     |
| beta-BHC                         | 1.20E+01                     | A    | 5.70E-01            | A    | X           |      |           |          |               |           |          |      | X     |
| delta-BHC                        | 8.60E-02                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      | X     |
| gamma-BHC                        | 7.00E+01                     | A    | 4.80E-01            | A    | X           |      |           |          |               |           |          |      | X     |
| Bromacil                         | 5.60E-03                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Bromoform Octanoate              | 1.10E+00                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Butachlor                        | 7.40E-03                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Captafol                         | 2.70E+00                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Captan                           | 1.60E+00                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Carbofenthion                    | 6.60E-01                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| Alpha-Chlordane                  | 2.30E+03                     | A    | 5.00E-01            | A    | X           |      |           |          |               |           |          |      | X     |
| Gamma-Chlordane                  | 2.30E+03                     | A    | 5.00E-01            | A    | X           |      |           |          |               |           |          |      | X     |
| Chlorobenzilate                  | 1.60E-01                     | A    | 1.00E+00            | A    | X           |      |           |          |               |           |          |      | X     |
| Chloroneb                        | 4.70E-03                     | A    | 1.00E+00            | *    |             |      |           |          |               |           |          |      | X     |
| DCPA/Dacthal                     | 9.50E-03                     | A    | 1.60E-01            | A    | X           |      |           |          |               |           |          |      | X     |
| 4,4'-DDD                         | 7.60E+02                     | A    | 5.00E-01            | A    | X           |      |           |          |               |           |          |      | X     |

TABLE 2-1 (continued)

## POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

| Pollutant                           | Toxic Weighting Factor (TWF) | POTW Removal Factor | Ref.      | Subcategory |      |               |          |            |   |
|-------------------------------------|------------------------------|---------------------|-----------|-------------|------|---------------|----------|------------|---|
|                                     |                              |                     |           | Truck Tank  |      | Rail Tank Car |          | Tank Barge |   |
|                                     | Chemical                     | Food                | Petroleum | Chemical    | Food | Petroleum     | Chemical | Food       |   |
| <b>PESTICIDES (continued)</b>       |                              |                     |           |             |      |               |          |            |   |
| 4,4'-DDE                            | 9.50E+02                     | A                   | 5.00E-01  | A           |      |               |          |            | X |
| 4,4'-DDT                            | 6.50E+03                     | A                   | 4.00E-01  | A           | X    |               |          |            | X |
| Diallate                            | 8.40E-03                     | A                   | 1.00E+00  | A           | X    |               |          |            | X |
| Dichlore                            | 4.00E+01                     | B                   | 1.00E+00  | *           |      |               |          |            | X |
| Dicofol                             | 5.70E+02                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Dieldrin                            | 5.70E+04                     | A                   | 1.40E-01  | A           | X    |               |          |            | X |
| Endosulfan I (alpha-)               | 1.00E+02                     | A                   | 5.00E-01  | A           |      |               |          |            | X |
| Endosulfan II (beta-)               | 1.00E+02                     | B                   | 1.00E+00  | F           | X    |               |          |            |   |
| Endosulfan sulfate                  | 1.00E+02                     | A                   | 4.20E-01  | A           | X    |               |          |            | X |
| Endrin                              | 9.80E+01                     | A                   | 5.00E-01  | A           |      |               |          |            | X |
| Endrin Aldehyde                     | 9.80E+01                     | A                   | 1.00E+00  | A           |      |               |          |            | X |
| Endrin Ketone                       | 9.80E+01                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Ethafluralin                        | 7.50E+00                     | A                   | 1.00E+00  | A           |      |               |          |            | X |
| Etridiazole                         | 4.60E-03                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Fenarimol                           | 6.20E-02                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Hepachlor Epoxide                   | 6.80E+03                     | A                   | 1.00E+00  | A           |      |               |          |            | X |
| Isodrin                             | 1.40E+01                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Isopropalin                         | 5.80E-01                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Methoxychlor                        | 1.90E+02                     | A                   | 4.20E-01  | A           |      |               |          |            | X |
| Metrizbin                           | 1.30E-03                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Mirex \ Dechlorane                  | 5.60E+03                     | A                   | 1.00E+00  | A           |      |               |          |            | X |
| Niumfen \ TOK                       | 4.80E-02                     | A                   | 1.00E+00  | A           |      |               |          |            | X |
| Pendamethalin                       | 1.50E-01                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Penachloronitrobenzene \ Quintozene | 2.70E-01                     | A                   | 1.00E+00  | A           |      |               |          |            | X |
| Cis-Permethrin                      | 3.40E+00                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Perthane                            | 1.40E+01                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Propachlor                          | 3.30E-01                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Propazine                           | 4.70E-03                     | A                   | 1.00E+00  | A           |      |               |          |            | X |
| Simazine                            | 5.60E-01                     | A                   | 1.00E+00  | A           | X    |               |          |            | X |
| Strobane                            | 1.10E+02                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Terbacil                            | 8.00E-01                     | A                   | 1.00E+00  | A           |      |               |          |            | X |
| Terbutylazine                       | 1.20E-02                     | A                   | 1.00E+00  | A           | X    |               |          |            | X |
| Triadimenfon                        | 5.80E-03                     | A                   | 1.00E+00  | *           |      |               |          |            | X |
| Trifluralin \ Treflan               | 4.20E+00                     | A                   | 2.90E-01  | A           |      |               |          |            | X |

**TABLE 2-1 (continued)**  
**POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS**

| Pollutant                      | Toxic Weighting Factor (TWF) | Ref. | POTW Removal Factor | Ref. | Chemical | Food | Petroleum | Chemical | Food | Petroleum | Chemical | Food | Truck | Rail | Barge | Subcategory |   |   |
|--------------------------------|------------------------------|------|---------------------|------|----------|------|-----------|----------|------|-----------|----------|------|-------|------|-------|-------------|---|---|
|                                |                              |      |                     |      |          |      |           |          |      |           |          |      |       |      |       | Truck Tank  |   |   |
|                                |                              |      |                     |      |          |      |           |          |      |           |          |      |       |      |       |             |   |   |
| <b>HERBICIDES</b>              |                              |      |                     |      |          |      |           |          |      |           |          |      |       |      |       |             |   |   |
| 2,4-Dichlorophenoxyacetic acid | 3.10E-03                     | A    | 5.10E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Dalapon                        | 5.10E-03                     | A    | 1.00E+00            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| 2,4-DB salts and esters        | 3.60E-02                     | A    | 1.00E+00            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Dicamba                        | 1.50E-02                     | A    | 1.00E+00            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Dichlorprop                    | 9.30E-02                     | A    | 1.00E+00            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Dinoseb \ DNBP                 | 1.90E+00                     | A    | 1.00E+00            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| MCPA                           | 1.60E-02                     | A    | 1.00E+00            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| MCPP                           | 6.90E-03                     | A    | 1.00E+00            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Picloram                       | 2.10E+00                     | A    | 1.00E+00            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| 2,4,5-T                        | 2.80E-01                     | A    | 4.40E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| 2,4,5-TP                       | 1.80E-01                     | A    | 5.60E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| <b>METALS</b>                  |                              |      |                     |      |          |      |           |          |      |           |          |      |       |      |       |             |   |   |
| Aluminum                       | 6.40E-02                     | A    | 1.20E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Antimony                       | 1.90E-01                     | B    | 4.40E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Arsenic                        | 4.00E+00                     | B    | 1.00E+00            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Barium                         | 2.00E-03                     | A    | 6.40E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Beryllium                      | 5.30E+00                     | B    | 5.40E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Boron                          | 1.80E-01                     | B    | 7.70E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Cadmium                        | 5.20E+00                     | A    | 1.00E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Calcium                        | 2.80E-05                     | B    | 4.50E-01            | F    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Chromium                       | 2.70E-02                     | A    | 3.30E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Chromium hexavalent            | 5.10E-01                     | A    | 9.40E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Cobalt                         | 1.10E-01                     | B    | 6.30E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Copper                         | 4.70E-01                     | A    | 1.60E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Iron                           | 5.60E-03                     | A    | 1.70E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Lead                           | 1.80E+00                     | A    | 8.00E-02            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Magnesium                      | 8.70E-04                     | B    | 7.40E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Manganese                      | 1.40E-02                     | A    | 5.90E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Mercury                        | 5.00E+02                     | A    | 4.00E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Molybdenum                     | 2.00E-01                     | A    | 4.80E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Nickel                         | 3.60E-02                     | A    | 4.90E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Phosphorus                     | 0.00E+00                     | C    | 3.10E-01            | D    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Potassium                      | 1.10E-03                     | A    | 8.00E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |
| Selenium                       | 1.10E+00                     | A    | 5.40E-01            | A    | X        | X    | X         | X        | X    | X         | X        | X    | X     | X    | X     | X           | X | X |

TABLE 2-1 (continued)

## POLLUTANTS, TOXIC WEIGHTING FACTORS, AND POTW REMOVAL FACTORS

| Pollutant                 | Toxic Weighting Factor (TWF) | POTW Removal Factor | Ref.     | Subcategory |               |            |        |      |           | Food | Petroleum | Chemical |
|---------------------------|------------------------------|---------------------|----------|-------------|---------------|------------|--------|------|-----------|------|-----------|----------|
|                           |                              |                     |          | Truck Tank  | Rail Tank Car | Tank Barge | Hopper | Food | Petroleum |      |           |          |
| <b>METALS (continued)</b> |                              |                     |          |             |               |            |        |      |           |      |           |          |
| Silver                    | 4.70E-01                     | A                   | 2.20E-01 | A           | X             | X          | X      |      |           |      |           |          |
| Sodium                    | 5.50E-06                     | B                   | 4.50E-01 | F           | X             | X          | X      |      |           |      |           |          |
| Sulfur                    | 5.60E-06                     | B                   | 8.80E-01 | A           | X             | X          | X      |      |           |      |           |          |
| Tantalum                  | 6.00E-02                     | A                   | 4.50E-01 | A           | X             | X          | X      |      |           |      |           |          |
| Thallium                  | 1.40E-01                     | B                   | 4.60E-01 | D           | X             | X          | X      |      |           |      |           |          |
| Tin                       | 3.00E-01                     | A                   | 3.50E-01 | A           | X             | X          | X      |      |           |      |           |          |
| Titanium                  | 2.90E-02                     | A                   | 3.10E-01 | A           | X             | X          | X      |      |           |      |           |          |
| Tungsten                  | 5.30E-03                     | B                   | 4.50E-01 | D           | X             | X          | X      |      |           |      |           |          |
| Vanadium                  | 6.20E-01                     | B                   | 5.70E-01 | A           | X             | X          | X      |      |           |      |           |          |
| Zinc                      | 5.10E-02                     | A                   | 2.20E-01 | A           | X             | X          | X      |      |           |      |           |          |
| Zirconium                 | 5.40E-01                     | A                   | 1.00E+00 | A           | X             | X          | X      |      |           |      |           |          |

\*\* Denotes chemicals for which no POTW removal factor is available. They are entered as having a factor of 1.00 (100% pass-through).

## References:

- A: Lotus 1-2-3 file from Gina Matthews, EPA, to Cal Franz, ERG, dated 27 August 1997 entitled "TWFRREMS.WK4."
- B: Memorandum from Jim Keating, Versar, Inc., to Ed Gardetto, EPA, dated 16 February 1995 entitled "TWF and Categorization for TEC Analytes."
- C: E-mail from Gina Matthews, EPA, to Cal Franz, ERG, dated 22 November 1996 entitled "TWF for Lanthanum."
- D: Facsimile from Gina Matthews, EPA, to Maureen Kaplan, ERG, dated 6 December 1995; Table 2-7.
- E: Facsimile from Gina Matthews, EPA, to Cal Franz, ERG, dated 30 December 1996 entitled "Updated TECL POTW Removals."
- F: Facsimile from Gina Matthews, EPA, to Maureen Kaplan, ERG, dated 6 December 1995; Appendix C.
- G: Lotus 1-2-3 file from Gina Matthews, EPA, to Cal Franz, ERG, dated 29 January 1997 entitled "TECL POTW Removals".

Examples of the effects of different aquatic and human health criteria on freshwater toxic weighting factors are presented in Table 2-2. As shown in this table, the toxic weighting factor is the sum of two criteria-weighted ratios: the former benchmark copper criterion divided by the human health criterion for the particular pollutant and the former benchmark copper criterion divided by the aquatic chronic criterion. For example, using the values reported in Table 2-2, 11 pounds of the benchmark chemical (copper) pose the same relative hazard in freshwater as one pound of cadmium because cadmium has a freshwater toxic weight 11 times greater than the toxic weight of copper (5.16 divided by 0.467 equals 11.05).

### **2.3 POTW REMOVAL FACTORS**

Calculating pound equivalents for direct dischargers differs from calculating for indirect dischargers because of the ability of POTWs to remove certain pollutants. The POTW removal factors are used as follows: If a facility is discharging 100 pounds of cadmium in its effluent stream to a POTW and the POTW has a 38 percent removal efficiency for cadmium, then the cadmium discharged to surface waters is only 62 pounds (1 minus 0.38 equals 0.62). If the regulation reduces cadmium discharged in the effluent stream to the POTW by 50 pounds, then the amount discharged to surface waters is calculated as 50 pounds multiplied by the POTW removal factor (50 pounds times 0.62 equals 31 pounds). The cost-effectiveness calculations then reflect the fact that the actual reduction of pollutant discharged to surface water is not 50 pounds (the change in the amount discharged to the POTW), but 31 pounds (the change in the amount actually discharged to surface water). A pollutant discharge that is unaffected by the POTW has a removal factor of 1. Table 2-1 presents the POTW removal factors for pollutants included in this analysis.

### **2.4 POLLUTANT REMOVALS AND POUND-EQUIVALENT CALCULATIONS**

The pollutant loadings have been calculated for each facility under each regulatory pollution control option for comparison with baseline (i.e., current practice) loadings. Pollutant removals are calculated simply as the difference between current and post-treatment discharges. These pollutant removals are converted into pound equivalents for the cost-effectiveness analysis. For direct dischargers, removals in pound equivalents are calculated as:

**TABLE 2-2**  
**EXAMPLES OF TOXIC WEIGHTING FACTORS**  
**BASED ON COPPER FRESHWATER CHRONIC CRITERIA**

| Pollutant   | Human Health Criteria ( $\mu\text{g/l}$ ) | Aquatic Chronic Criteria ( $\mu\text{g/l}$ ) | Weighting Calculation | Toxic Weighting Factor |
|-------------|---|--|-----------------------|------------------------|
| Copper      | ---                                       | 12.0   | 5.6/12.0              | 0.467                  |
| Cadmium     | 84  | 1.1  | 5.6/84 + 5.6/1.1      | 5.16                   |
| Naphthalene | 41,026                                    | 370  | 5.6/41,026 + 5.6/370  | 0.015                  |

Notes: Human health and aquatic chronic criteria are maximum contamination thresholds. Units for criteria are micrograms of pollutant per liter of water.

Source: Versar, Inc., 1995.

$$\text{Removals}_{\text{pe}} = \text{Removals}_{\text{pounds}} \times \text{Toxic weighting factor}$$

For indirect dischargers, removals in pound equivalents are calculated as:

$$\text{Removals}_{\text{pe}} = \text{Removals}_{\text{pounds}} \times \text{Toxic weighting factor} \times \text{POTW removal factor}$$

Total removals for each option are then calculated by adding up the removals of all pollutants included in the cost-effectiveness analysis for a given subcategory. Total pollutant and pound-equivalent removals estimated for each option are presented by subcategory in Appendix A.

## 2.5 ANNUALIZED COSTS OF COMPLIANCE

Annualized costs of compliance have been developed for each regulatory pollution control option (see the Economic Analysis for proposal (U.S. EPA, 1998a). In brief, the annualized cost considers the capital investment needed to purchase and install new equipment, the annual cost of operating and maintaining the equipment, and the cost of money needed to finance the investment. The annualized costs presented in Section 4 represent the pre-tax costs to the TEC industry.

## 2.6 CALCULATION OF THE COST-EFFECTIVENESS VALUES

Cost-effectiveness ratios are calculated separately for direct and indirect dischargers and by subcategory. Within each of these many groupings, the pollution control options are ranked in ascending order of pound equivalents removed. The incremental cost-effectiveness value for a particular control option is calculated as the ratio of the incremental annual cost to the incremental pound equivalents removed. The incremental effectiveness may be viewed primarily in comparison to the baseline scenario and to other regulatory pollution control options. Cost-effectiveness values are reported in units of dollars per pound equivalent of pollutant removed.

For the purpose of comparing cost-effectiveness values of options under review to those of other promulgated rules, compliance costs used in the cost-effectiveness analysis are adjusted to 1981 dollars using *Engineering News Record's* Construction Cost Index (CCI). This adjustment factor is calculated as follows:

$$\text{Adjustment factor} = 1981 \text{ CCI}/1994 \text{ CCI} = 3,535/5,408 = 0.654$$

The equation used to calculate incremental cost-effectiveness is:

$$CE_k = \frac{ATC_k - ATC_{k-1}}{PE_k - PE_{k-1}}$$

where:

$CE_k$  = Cost-effectiveness of Option k

$ATC_k$  = Total annualized treatment cost under Option k

$PE_k$  = Pound equivalents removed by Option k

Cost-effectiveness measures the incremental unit cost of pollutant removal of Option k (in pound equivalents) in comparison to Option k-1. The numerator of the equation,  $ATC_k$  minus  $ATC_{k-1}$ , is simply the incremental annualized treatment cost in moving from Option k-1 (an option that removes fewer pound equivalents of pollutants) to Option k (an option that removes more pound equivalents of pollutants). Similarly, the denominator is the incremental removals achieved in going from Option k-1 to k.

## 2.7 COMPARISON OF COST-EFFECTIVENESS VALUES

Because the options are ranked in ascending order of pound equivalents of pollutants removed, any pollution control option that has higher costs but lower removals than another option can be immediately identified (the cost-effectiveness value for the next option becomes negative). When negative values are computed for Option k, Option k-1 is considered "dominated" (having a higher cost and lower removals than Option k). Option k-1 is then removed from cost-effectiveness calculations, and all cost-effectiveness values within a regulatory grouping are then recalculated without the dominated option. This process continues until

all dominated options are eliminated. The remaining options can then be presented as viable in terms of their incremental cost-effectiveness values for regulatory consideration.

## **SECTION 3**

### **POLLUTION CONTROL AND MONITORING OPTIONS**

EPA may subcategorize an industry to establish effluent limitations guidelines based on untreated wastewater characteristics, commodity transported, mode of transportation, or other factors. EPA divided the TEC industry into 11 subcategories, listed in Section 1, based on the commodity transported and the mode of transportation. In addition to subcategories, facilities are also identified by discharge status: direct or indirect. BAT applies to direct dischargers; PSES applies to indirect dischargers. Additional pollutants may be controlled or reduced by BAT and PSES, but are not part of the cost-effectiveness analysis because 1) a toxic weighting factor is not available for the pollutant, or 2) reliable estimates of pollutant removals are not available.

#### **3.1 POLLUTION CONTROL OPTIONS**

The Development Document (U.S. EPA, 1998b) presents a detailed description of the TEC industry subcategories and pollution control options for each subcategory. Table 3-1 outlines the technology options for each of the TEC industry subcategories. EPA developed between one and three technology options for each subcategory based on incremental technology additions to a wastewater treatment train. Each succeeding option builds on the previous option. The incremental or differentiating technology for a succeeding option is in italics.

#### **3.2 MONITORING OPTIONS**

EPA considered each technology option with up to six monitoring options:

- No monitoring
- Quarterly

**TABLE 3-1**  
**TECHNOLOGY OPTIONS FOR TEC INDUSTRY SUBCATEGORIES**

| Option                                     | Description   |
|--|---|
| <b>Truck Chemical Direct Dischargers</b>   |   |
| 1 <sup>1</sup>                             | Flow reduction, equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, biological treatment, and sludge dewatering   |
| 2  | Flow reduction, equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, biological treatment, <i>activated carbon adsorption</i> , and sludge dewatering          |
| <b>Truck Chemical Indirect Dischargers</b> |   |
| 1  | Flow reduction, equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, and sludge dewatering   |
| 2  | Flow reduction, equalization, oil/water separation, chemical oxidation, neutralization, coagulation, clarification, <i>activated carbon adsorption</i> , and sludge dewatering                                |
| <b>Rail Chemical Direct Dischargers</b>    |   |
| 1 <sup>2</sup>                             | Flow reduction, oil/water separation, equalization, biological treatment, and sludge dewatering   |
| 2  | Flow reduction, oil/water separation, equalization, <i>dissolved air flotation (with flocculation and pH adjustment)</i> , biological treatment, and sludge dewatering  |
| 3  | Flow reduction, oil/water separation, equalization, dissolved air flotation (with flocculation and pH adjustment), biological treatment, <i>organo-clay/activated carbon adsorption</i> and sludge dewatering |
| <b>Rail Chemical Indirect Dischargers</b>  |   |
| 1  | Flow reduction, and oil/water separation  |
| 2  | Flow reduction, oil/water separation, <i>equalization, dissolved air flotation (with flocculation and pH adjustment)</i> , and sludge dewatering  |
| 3  | Flow reduction, oil/water separation, equalization, dissolved air flotation (with flocculation and pH adjustment), <i>organo-clay/activated carbon adsorption</i> , and sludge dewatering                     |

**TABLE 3-1(continued)**  
**TECHNOLOGY OPTIONS FOR TEC INDUSTRY SUBCATEGORIES**

| <b>Barge Chemical Direct Dischargers</b>   |   |
|--|---|
| 1  | Flow reduction, oil/water separation, dissolved air flotation, filter press, biological treatment, and sludge dewatering                                  |
| 2  | Flow reduction, oil/water separation, dissolved air flotation, filter press, biological treatment, <i>reverse osmosis</i> , and sludge dewatering         |
| <b>Barge Chemical Indirect Dischargers</b> |   |
| 1  | Flow reduction, oil/water separation, dissolved air flotation, and in-line filter press   |
| 2  | Flow reduction, oil/water separation, dissolved air flotation, in-line filter press, <i>biological treatment, and sludge dewatering</i>                   |
| 3  | Flow reduction, oil/water separation, dissolved air flotation, in-line filter press, biological treatment, <i>reverse osmosis</i> , and sludge dewatering |
| <b>Food Grade</b>                          |   |
| 1  | Flow reduction, and oil/water separation  |
| 2  | Flow reduction, oil/water separation, <i>equalization, biological treatment, and sludge dewatering</i>  |
| <b>Petroleum</b>                           |   |
| 1 <sup>3</sup>                             | Flow reduction, equalization, oil/water separation, and chemical precipitation  |
| 2  | Flow reduction, equalization, oil/water separation, activated carbon adsorption, and recycle/reuse  |
| <b>Hopper</b>                              |   |
| 1  | Flow reduction, and gravity separation  |

Note: EPA developed options based on incremental technology additions to a wastewater treatment train. Each succeeding option builds on the previous option. The incremental, or differentiating, technology for a succeeding option is in italics.

<sup>1</sup> Option 1 has identical costs and removals as Option 2.

<sup>2</sup> Equalization was originally costed with Option 2, but later moved to Option 1; costs have not been adjusted.

<sup>3</sup> Because Option 1 would result in higher costs and lower removals than Option 2, it was not completely costed.

- **Bimonthly**
- **Monthly**
- **Combination of weekly and monthly**
- **Weekly**

For example, EPA developed three technology options for the Rail Chemical subcategory (see Table 3-1) with four monitoring options. This results in 12 separate cost combinations. This cost-effectiveness analysis presents costs and pollutant removals associated with monthly monitoring for all indirect dischargers, and costs and removals for a combination of monthly and weekly monitoring for direct dischargers.

## SECTION 4

### RESULTS OF COST-EFFECTIVENESS ANALYSIS

EPA calculated cost-effectiveness (CE) ratios for direct and indirect dischargers in the 11 TEC industry subcategories. This section presents the ratios by subcategory. (Section 3 outlines technology options for each subcategory.) Costs are presented on a pre-tax basis in 1981 dollars; costs are estimated in 1994 dollars and deflated to 1981 dollars to facilitate comparison with effluent guidelines of other industries. The CE ratios are expressed on an incremental and average basis. Average CE is equal to total option costs divided by total option removals. Although the decision on the relative cost-effectiveness of an option is based on the incremental CE ratio, average CE also provides useful information about removal efficiencies.

The monitoring frequency included in the costs is listed for each table. Because the primary purpose of cost-effectiveness analysis is the comparison of the removal efficiencies of technology options, and monitoring adds costs but no pollutant removals, the CE comparison needs to be made using the same monitoring option for all technology options in the comparison.

Where data are based on fewer than three unweighted facilities, the removal and/or the cost data may be suppressed in order to protect confidential business information. Such entries are marked "ND" for not disclosed.

#### 4.1 TRUCK CHEMICAL

All Truck Chemical facilities contained in the detailed questionnaire database are indirect dischargers; however, direct dischargers were identified in the screener questionnaire data.

Table 4-1 presents the results of the CE analysis for direct dischargers. This analysis is based on unweighted data because the facilities are only present in the screener database. There are two technology options for direct dischargers in this subcategory (see Table 3-1). Option 1 results in identical costs and

TABLE 4-1

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**TRUCK CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION OF MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Pre-tax Annualized Cost (\$1981) | Pre-tax Annualized Cost (\$1981) | Incremental Cost-Effectiveness (\$1981/PE) | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|----------------------------------|----------------------------------|--|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |                                  |                                  |  |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA                               | NA                               | NA   | NA                                     |
| Option 1          | NA                             | NA                               | NA                             | NA                               | ND                               | ND                               | ND   | ND                                     |
| Option 2 *        | ND                             | ND                               | ND                             | ND                               | ND                               | ND                               | ND   | \$602                                  |

\* Option 1 has identical costs and removals as Option 2.

ND: Not disclosed due to business confidentiality.

removals as Option 2. The incremental CE ratio is \$602 under Option 2. Option 2 is the proposed option for direct dischargers in the Truck Chemical subcategory.

Table 4-2 presents the results of the CE analysis for the indirect dischargers. There are two technology options for the Truck Chemical Indirect Dischargers subcategory (see Table 3-1). The incremental CE ratio ranges from \$86/pound equivalents (pe) under Option 1 to \$309/pe under Option 2. Option 2 is the proposed option for indirect dischargers in the Truck Chemical subcategory.

#### **4.2 RAIL CHEMICAL**

All Rail Chemical facilities in the detailed questionnaire database are indirect dischargers; however, direct dischargers were identified in the screener questionnaire data. Table 4-3 presents the results of the CE analysis for direct dischargers. This analysis is based on unweighted data, because the facilities are only present in the screener database. There are three technology options for the Rail Chemical Direct Dischargers subcategory (see Table 3-1). The incremental CE ratio ranges from \$84 under Option 1 to \$526 under Option 3. Option 1 is the proposed option for direct dischargers in the Rail Chemical subcategory.

Table 4-4 presents the results of the CE analysis for the indirect dischargers. There are three technology options for the Rail Chemical Indirect Dischargers subcategory (see Table 3-1). The incremental CE ratio ranges from \$56/pe under Option 1 to \$362/pe under Option 3. Option 1 is the proposed option for indirect dischargers in the Rail Chemical subcategory.

#### **4.3 BARGE CHEMICAL AND PETROLEUM**

The Barge Chemical and Petroleum subcategory includes both direct and indirect dischargers. Table 4-5 presents the results of the CE analysis for the direct dischargers. There are two technology options for direct dischargers in this subcategory (see Table 3-1). The incremental CE ratio ranges from \$104/pe under Option 1 to \$1,444/pe under Option 2. Option 1 is the proposed option for direct dischargers in the Barge Chemical and Petroleum subcategory.

TABLE 4-2

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**TRUCK CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Incremental Cost-Effectiveness (\$1981/PE) | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA   | NA                                     |
| Option 1          | 149,794.8                      | \$12,854,782                     | 149,794.8                      | \$12,854,782                     | \$86                                       | \$86                                   |
| Option 2          | 171,485.9                      | \$19,567,341                     | 21,691.1                       | \$6,712,559                      | \$309                                      | \$114                                  |

TABLE 4-3

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**RAIL CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION OF MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA                                     |
| Option 1          | ND                             | ND                               | ND                             | ND                               | \$84                                   |
| Option 2          | ND                             | ND                               | ND                             | ND                               | \$260                                  |
| Option 3          | ND                             | ND                               | ND                             | ND                               | \$526                                  |
|                   |                                |                                  |                                |                                  | \$123                                  |
|                   |                                |                                  |                                |                                  | \$142                                  |

ND: Not disclosed due to business confidentiality.

TABLE 4-4

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**RAIL CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA                                     |
| Option 1          | 20,825.6                       | \$1,173,145                      | 20,825.6                       | \$1,173,145                      | \$56                                   |
| Option 2          | 22,630.8                       | \$1,758,116                      | 1,805.2                        | \$584,971                        | \$324                                  |
| Option 3          | 24,470.0                       | \$2,423,227                      | 1,839.2                        | \$665,111                        | \$78                                   |
|                   |                                |                                  |                                |                                  | \$362                                  |

TABLE 4-5

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**BARGE CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION OF MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Incremental Cost-Effectiveness (\$1981/PE) | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA   | NA                                     |
| Option 1          | 13,856.1                       | \$1,437,712                      | 13,856.1                       | \$1,437,712                      | \$104                                      | \$104                                  |
| Option 2          | 14,022.7                       | \$1,678,308                      | 166.6                          | \$240,596                        | \$1,444                                    | \$120                                  |

Table 4-6 presents the results of the CE analysis for the indirect dischargers in the Barge Chemical and Petroleum subcategory. There are three technology options for the Barge Chemical and Petroleum Indirect Dischargers subcategory (see Table 3-1). The incremental CE ratio ranges from \$838/pe under Option 2 to \$15,364/pe under Option 3. EPA has chosen not to set pretreatment standards for existing indirect dischargers in the Barge Chemical and Petroleum subcategory at this time.

#### **4.4 TRUCK PETROLEUM**

All Truck Petroleum facilities in the detailed questionnaire database are indirect dischargers. Table 4-7 presents the results of the CE analysis for the indirect dischargers. There are two technology options for indirect dischargers in the Petroleum subcategory (see Table 3-1). Option 1 results in higher costs and lower removals than Option 2, and therefore was not completely costed. The incremental CE ratio is \$24,362/pe under Option 2. EPA has chosen not to regulate the Truck Petroleum subcategory at this time.

#### **4.5 RAIL PETROLEUM**

All Rail Petroleum facilities in the detailed questionnaire database are indirect dischargers. Table 4-8 presents the results of the CE analysis for the indirect dischargers. There are two technology options for indirect dischargers in this subcategory (see Table 3-1). Option 1 results in higher costs and lower removals than Option 2, and therefore was not completely costed. The incremental CE ratio is (\$1,450)/pe under Option 2 due to the fact that the technology option results in a cost savings for the modeled facility. EPA has chosen not to regulate the Rail Petroleum subcategory at this time.

#### **4.6 TRUCK FOOD**

All Truck Food facilities in the detailed questionnaire database are indirect dischargers; however, EPA believes direct dischargers, though rare, do exist in this subcategory. Table 4-9 presents the results of the CE analysis for direct dischargers. This analysis assumed that direct discharger facilities have the same characteristics as indirect dischargers; therefore, facility data for indirect dischargers can be used as a proxy

TABLE 4-6

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**BARGE CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Incremental Cost-Effectiveness (\$1981/PE) | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA   | NA                                     |
| Option 1          | ND                             | ND                               | ND                             | ND                               | ND   | \$2,376                                |
| Option 2          | ND                             | ND                               | ND                             | ND                               | ND   | \$838                                  |
| Option 3          | ND                             | ND                               | ND                             | ND                               | ND   | \$15,364                               |
|                   |                                |                                  |                                |                                  |  | \$1,634                                |

ND: Not disclosed due to business confidentiality.

TABLE 4-7

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**TRUCK PETROLEUM SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Incremental Cost-Effectiveness (\$1981/PE) | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA   | NA                                     |
| Option 1          | NC                             | NC                               | NC                             | NC                               | NC   | NC                                     |
| Option 2          | 28.2                           | \$687,005                        | 28.2                           | \$687,005                        | \$24,362                                   | \$24,362                               |

NC: Not completely costed; would result in higher costs and lower removals than option 2.

TABLE 4-8

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**RAIL PETROLEUM SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Incremental Cost-Effectiveness (\$1981/PE) | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA   | NA                                     |
| Option 1          | NC                             | NC                               | NC                             | NC                               | NC   | NC                                     |
| Option 2          | 0.1                            | (\$145)                          | 0.1                            | (\$145)                          | (\$1,450)                                  | (\$1,450)                              |

NC: Not completely costed; would result in higher costs and lower removals than option 2.

TABLE 4-9

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**TRUCK FOOD SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION OF MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Incremental Cost-Effectiveness (\$1981/PE) | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA   | NA                                     |
| Option 1          | 0.6                            | \$3,739,820                      | 0.6                            | \$3,739,820                      | \$6,233,033                                | \$6,233,033                            |
| Option 2          | 50,974.1                       | \$7,854,805                      | 50,973.5                       | \$4,114,985                      | \$81                                       | \$154                                  |

for direct dischargers. In order to represent direct dischargers, the POTW removal factors were deleted from the calculation of pound equivalents removed. There are two technology options for direct dischargers in the Truck Food subcategory (see Table 3-1). The incremental CE ratio ranges from \$81/pe under Option 2 to \$6,233,033/pe under Option 1. EPA has chosen not to set BAT standards for direct dischargers in the Truck Food subcategory at this time.

Table 4-10 presents the results of the CE analysis for the indirect dischargers. There are two technology options for indirect dischargers in the Food Grade subcategory (see Table 3-1). The incremental CE ratio ranges from \$610/pe under Option 2 to \$30,588,400/pe under Option 1. EPA has chosen not to regulate indirect dischargers in the Truck Food subcategory at this time.

#### **4.7 RAIL FOOD**

All Rail Food facilities in the detailed questionnaire database are indirect dischargers; however, EPA believes direct dischargers, though rare, do exist in this subcategory. Table 4-11 presents the results of the CE analysis for direct dischargers. This analysis assumed that direct discharger facilities have the same characteristics as indirect dischargers; therefore, facility data for indirect dischargers can be used as a proxy for direct dischargers. In order to represent direct dischargers, the POTW removal factors were deleted from the calculation of pound equivalents removed. There are two technology options for direct dischargers in the Rail Food subcategory (see Table 3-1). The incremental CE ratio is undefined under Option 1 since this option results in no incremental pollutant removals. The incremental CE under Option 2 is \$234/pe. EPA has chosen not to set BAT standards for direct dischargers in the Rail Food subcategory at this time.

Table 4-12 presents the results of the CE analysis for the indirect dischargers. There are two technology options for indirect dischargers in the Food Grade subcategory (see Table 3-1). The incremental CE ratio is undefined under Option 1 since this option results in no incremental pollutant removals. The incremental CE under Option 2 is \$1,766/pe. EPA has chosen not to regulate indirect dischargers in the Rail Food subcategory at this time.

TABLE 4-10

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**TRUCK FOOD SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA                                     |
| Option 1          | 0.1                            | \$3,058,840                      | 0.1                            | \$3,058,840                      | \$30,588,400                           |
| Option 2          | 6,750.5                        | \$7,173,825                      | 6,750.4                        | \$4,114,985                      | \$610                                  |
|                   |                                |                                  |                                |                                  | \$1,063                                |

TABLE 4-11

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**RAIL FOOD SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION OF MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Incremental Cost-Effectiveness (\$1981/PE) | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA   | NA                                     |
| Option 1          | ND                             | ND                               | ND                             | ND                               | *  | *                                      |
| Option 2          | ND                             | ND                               | ND                             | ND                               | \$234                                      | \$399                                  |

\* Cost-effectiveness is undefined because there are no incremental pollutant removals.  
 ND: Not disclosed due to business confidentiality.

TABLE 4-12

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**RAIL FOOD SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA                                     |
| Option 1          | ND                             | ND                               | ND                             | ND                               | *                                      |
| Option 2          | ND                             | ND                               | ND                             | ND                               | \$2,822                                |

\* Cost-effectiveness is undefined because there are no incremental pollutant removals.

ND: Not disclosed due to business confidentiality.

#### **4.8 BARGE FOOD**

All Barge Food facilities in the detailed questionnaire database are indirect dischargers; however, EPA believes direct dischargers, though rare, do exist in this subcategory. Table 4-13 presents the results of the CE analysis for direct dischargers. This analysis assumed that direct discharger facilities have the same characteristics as indirect dischargers; therefore, facility data for indirect dischargers can be used as a proxy for direct dischargers. In order to represent direct dischargers, the POTW removal factors were deleted from the calculation of pound equivalents removed. There are two technology options for direct dischargers in the Barge Food subcategory (see Table 3-1). The incremental CE ratio is undefined under Option 1 since this option results in no incremental pollutant removals. The incremental CE under Option 2 is \$138/pe. EPA has chosen not to set BAT standards for direct dischargers in the Barge Food subcategory at this time.

Table 4-14 presents the results of the CE analysis for the indirect dischargers. There are two technology options for indirect dischargers in the Food Grade subcategory (see Table 3-1). Because the modeled facility has sufficient treatment in place, no incremental pollutant removals exist under Option 1; therefore the CE for Option 1 is undefined. The incremental CE under Option 2 is \$1,721/pe. EPA has chosen not to regulate indirect dischargers in the Barge Food subcategory at this time.

#### **4.9 TRUCK HOPPER**

All Truck Hopper facilities in the detailed questionnaire database are indirect dischargers. Table 4-15 presents the results of the CE analysis for the indirect dischargers. There is one technology option for indirect dischargers in the Hopper subcategory (see Table 3-1). The incremental CE ratio is \$183,823/pe under Option 1. EPA has chosen not to regulate the Truck Hopper subcategory at this time.

#### **4.10 RAIL HOPPER**

All Rail Hopper facilities in the detailed questionnaire database are indirect dischargers. Table 4-16 presents the results of the CE analysis for the indirect dischargers. There is one technology option for indirect dischargers in the Hopper subcategory (see Table 3-1). Because the modeled facility has sufficient treatment

**TABLE 4-13**  
**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**BARGE FOOD SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION OF MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA                                     |
| Option 1          | ND                             | ND                               | ND                             | ND                               | *                                      |
| Option 2          | ND                             | ND                               | ND                             | ND                               | \$433                                  |

\* Cost-effectiveness is undefined because there are no incremental pollutant removals.

ND: Not disclosed due to business confidentiality.

TABLE 4-14

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**BARGE FOOD SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA                                     |
| Option 1          | ND                             | ND                               | ND                             | ND                               | *                                      |
| Option 2          | ND                             | ND                               | ND                             | ND                               | \$1,721                                |
|                   |                                |                                  |                                |                                  | \$3,272                                |

\* Cost-effectiveness is undefined because there are no incremental pollutant removals.

ND: Not disclosed due to business confidentiality.

TABLE 4-15

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**TRUCK HOPPER SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA                                     |
| Option 1          | 1.5                            | \$275,734                        | 1.5                            | \$275,734                        | \$183,823                              |

TABLE 4-16

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**RAIL HOPPER SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |
| Baseline          | 0.0                            | NA<br>ND                         | NA<br>ND                       | NA<br>ND                         | NA                                     |
| Option 1          | ND                             |                                  |                                |                                  | *                                      |

\* Cost-effectiveness is undefined because there are no incremental pollutant removals.

ND: Not disclosed due to business confidentiality.

in place, no incremental pollutant removals exist under Option 1; therefore, the CE for Option 1 is undefined. EPA has chosen not to regulate indirect dischargers in the Rail Hopper subcategory at this time.

#### 4.11 BARGE HOPPER

The Barge Hopper subcategory includes both direct and indirect dischargers. Table 4-17 presents the results of the CE analysis for the direct dischargers. There is one technology option for direct dischargers in the Hopper subcategory (see Table 3-1). The incremental CE ratio is \$27,674/pe under Option 1. EPA has chosen not to regulate direct dischargers in the Barge Hopper subcategory at this time.

Table 4-18 presents the results of the CE analysis for the indirect dischargers. There is one technology option for indirect dischargers in this subcategory (see Table 3-1). The incremental CE ratio is \$165,190/pe under Option 1. EPA has chosen not to regulate indirect dischargers in the Barge Hopper subcategory at this time.

TABLE 4-17

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**BARGE HOPPER SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA                                     |
| Option 1          | 11.7                           | \$323,784                        | 11.7                           | \$323,784                        | \$27,674                               |

TABLE 4-18

**COST-EFFECTIVENESS OF POLLUTION CONTROL OPTIONS**  
**BARGE HOPPER SUBCATEGORY**  
**INDIRECT DISCHARGERS**  
**MONTHLY MONITORING**

| Technology Option | Total Annual                   |                                  | Incremental                    |                                  | Average Cost-Effectiveness (\$1981/PE) |
|-------------------|--------------------------------|----------------------------------|--------------------------------|----------------------------------|--|
|                   | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) | Pound Equivalents Removed (PE) | Pre-tax Annualized Cost (\$1981) |  |
| Baseline          | 0.0                            | NA                               | NA                             | NA                               | NA                                     |
| Option 1          | 0.1                            | \$16,519                         | 0.1                            | \$16,519                         | \$165,190                              |

## **SECTION 5**

### **COMPARISON OF COST-EFFECTIVENESS VALUES WITH PROMULGATED RULES**

In addition to subcategory-specific cost-effectiveness ratios, this analysis also includes cost-effectiveness ratios for BAT and PSES for the TEC industry as a whole. EPA calculates the cost-effectiveness ratio for the entire industry using two factors: the incremental annualized cost and incremental removals for the proposed options for each subcategory. The incremental values are totaled to provide the cost-effectiveness ratio for the industry. The proposed options are:

- Truck Chemical: Option 2 for both direct and indirect dischargers
- Rail Chemical: Option 1 for both direct and indirect dischargers
- Barge Chemical and Petroleum: Option 1 for direct dischargers (Indirect dischargers are not regulated at this time.)
- Truck Petroleum: not regulated at this time
- Rail Petroleum: not regulated at this time
- Truck Food: not regulated at this time<sup>4</sup>
- Rail Food: not regulated at this time<sup>4</sup>
- Barge Food: not regulated at this time<sup>4</sup>
- Truck Hopper: not regulated at this time
- Rail Hopper: not regulated at this time
- Barge Hopper: not regulated at this time

Tables 5-1 and 5-2 illustrate the process for calculating the industry cost-effectiveness for BAT and PSES, respectively.

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<sup>4</sup> At this time EPA is proposing BPT and BCT, but not BAT for the Food subcategories.

TABLE 5-1

INCREMENTAL COST-EFFECTIVENESS OF POLLUTANT CONTROL OPTIONS  
TRANSPORTATION EQUIPMENT CLEANING INDUSTRY  
DIRECT DISCHARGERS

| Subcategory     | Incremental                            |               |                               |
|-----------------|--|---------------|-------------------------------|
|                 | Pre-tax<br>Annualized Cost<br>(\$1981) | PE<br>Removed | Cost-Effectiveness<br>(\$/PE) |
| Truck Chemical  | ND                                     | ND            | \$602                         |
| Rail Chemical   | ND                                     | ND            | \$84                          |
| Barge Chemical  | \$1,437,712                            | 13,856.1      | \$104                         |
| Truck Petroleum | NA                                     | NA            | NA                            |
| Rail Petroleum  | NA                                     | NA            | NA                            |
| Truck Food      | NA                                     | NA            | NA                            |
| Rail Food       | NA                                     | NA            | NA                            |
| Barge Food      | NA                                     | NA            | NA                            |
| Truck Hopper    | NA                                     | NA            | NA                            |
| Rail Hopper     | NA                                     | NA            | NA                            |
| Barge Hopper    | NA                                     | NA            | NA                            |
| Industry Total  | \$1,549,180                            | 14,399.2      | \$108                         |

ND: Not disclosed due to business confidentiality.

NA: Not applicable.

Note: Incremental costs and removals are calculated from the selected option and preceding option in the subcategory cost-effectiveness analysis.

TABLE 5-2

INCREMENTAL COST-EFFECTIVENESS OF POLLUTANT CONTROL OPTIONS  
TRANSPORTATION EQUIPMENT CLEANING INDUSTRY  
INDIRECT DISCHARGERS

| Subcategory     | Incremental                            |               |                               |
|-----------------|--|---------------|-------------------------------|
|                 | Pre-tax<br>Annualized Cost<br>(\$1981) | PE<br>Removed | Cost-Effectiveness<br>(\$/PE) |
| Truck Chemical  | \$6,712,559                            | 21,691.1      | \$309                         |
| Rail Chemical   | \$1,173,145                            | 20,825.6      | \$56                          |
| Barge Chemical  | NA                                     | NA            | NA                            |
| Truck Petroleum | NA                                     | NA            | NA                            |
| Rail Petroleum  | NA                                     | NA            | NA                            |
| Truck Food      | NA                                     | NA            | NA                            |
| Rail Food       | NA                                     | NA            | NA                            |
| Barge Food      | NA                                     | NA            | NA                            |
| Truck Hopper    | NA                                     | NA            | NA                            |
| Rail Hopper     | NA                                     | NA            | NA                            |
| Barge Hopper    | NA                                     | NA            | NA                            |
| Industry Total  | \$7,928,221                            | 42,882.5      | \$185                         |

Note: Incremental costs and removals are calculated from the selected option and preceding option in the subcategory cost-effectiveness analysis.

Table 5-1 presents the incremental cost-effectiveness of proposed pollution control options for direct dischargers in the TEC industry. The incremental cost-effectiveness resulting from the proposed options for direct dischargers in the Truck Chemical, Rail Chemical, and Barge Chemical and Petroleum subcategories is \$108/pe.

Table 5-2 presents the incremental cost-effectiveness of proposed pollution control options for indirect dischargers in the TEC industry. The incremental industry cost-effectiveness resulting from the proposed options for indirect dischargers in the Truck Chemical and Rail Chemical subcategories is \$185/pe.

Tables 5-3 and 5-4 present the cost-effectiveness values for effluent limitations guidelines and standards in other industries for direct dischargers under BAT and indirect dischargers under PSES. The numbers presented for this rulemaking are pre-tax costs, whereas many of the numbers presented for other effluent guidelines are post-tax costs—that is, the actual costs faced by the firms, not just the total cost of the equipment (which is subsidized by reductions in taxable income). Thus, direct comparisons between this rulemaking and others cannot be made easily. An equivalent post-tax cost-effectiveness, however, is approximately 60 to 70 percent of pre-tax cost-effectiveness. Appendix B contains the supporting information for baseline discharges.

**TABLE 5-3**  
**INDUSTRY COMPARISON OF BAT COST-EFFECTIVENESS**  
**FOR DIRECT DISCHARGERS**  
**(Toxic and Nonconventional Pollutants Only; Copper-Based Weights<sup>a</sup>; \$ 1981)**

| Industry   | PE Currently Discharged<br>(thousands) | PE Remaining at Selected<br>Option<br>(thousands) | Cost-Effectiveness of<br>Selected Option(s)<br>(\$/PE removed) |
|--|--|---|--|
| Aluminum Forming   | 1,340                                  | 90  | 121  |
| Battery Manufacturing  | 4,126                                  | 5   | 2  |
| Canmaking  | 12                                     | 0.2   | 10   |
| Centralized Waste Treatment <sup>c</sup>   | 3,372                                  | 1,261-1,267                                       | 5-7  |
| Coal Mining  | BAT=BPT                                | BAT=BPT   | BAT=BPT  |
| Coil Coating   | 2,289                                  | 9   | 49   |
| Copper Forming   | 70                                     | 8   | 27   |
| Electronics I  | 9                                      | 3   | 404  |
| Electronics II   | NA                                     | NA  | NA   |
| Foundries  | 2,308                                  | 39  | 84   |
| Inorganic Chemicals I  | 32,503                                 | 1,290   | <1   |
| Inorganic Chemicals II   | 605                                    | 27  | 6  |
| Iron & Steel   | 40,746                                 | 1,040   | 2  |
| Leather Tanning  | 259                                    | 112   | BAT=BPT  |
| Metal Finishing  | 3,305                                  | 3,268   | 12   |
| Metal Products and Machinery <sup>c</sup>  | 140                                    | 70  | 50   |
| Nonferrous Metals Forming  | 34                                     | 2   | 69   |
| Nonferrous Metals Mfg I  | 6,653                                  | 313   | 4  |
| Nonferrous Metals Mfg II   | 1,004                                  | 12  | 6  |
| Oil and Gas: Offshore <sup>b</sup><br>Coastal—Produced Water/TWC<br>Drilling Waste | 3,809<br>951<br>BAT = Current Practice | 2,328<br>239<br>BAT = Current Practice            | 33<br>35<br>BAT = Current Practice                             |
| Organic Chemicals  | 54,225                                 | 9,735   | 5  |
| Pesticides   | 2,461                                  | 371   | 14   |
| Pharmaceuticals <sup>c</sup>   | A/C<br>B/D<br>897<br>90                | 47<br>0.5   | 47<br>96   |
| Plastics Molding & Forming   | 44                                     | 41  | BAT=BPT  |
| Porcelain Enameling  | 1,086                                  | 63  | 6  |
| Petroleum Refining   | BAT=BPT                                | BAT=BPT   | BAT=BPT  |
| Pulp & Paper <sup>c</sup>  | 61,713                                 | 2,628   | 39   |
| Textile Mills  | BAT=BPT                                | BAT=BPT   | BAT=BPT  |
| Transportation Equipment<br>Cleaning <sup>c</sup>                                  | 15                                     | 0.8   | 108  |

<sup>a</sup>Although toxic weighting factors for priority pollutants varied across these rules, this table reflects the cost-effectiveness at the time of regulation.

<sup>b</sup>Produced water only; for produced sand and drilling fluids and drill cuttings, BAT=NSPS.

<sup>c</sup>Proposed.

TABLE 5-4

**INDUSTRY COMPARISON OF PSES COST-EFFECTIVENESS  
FOR INDIRECT DISCHARGERS**  
(Toxic and Nonconventional Pollutants Only; Copper-Based Weights<sup>a</sup>; \$ 1981)

| Industry <sup>b</sup>                     | PE Currently Discharged<br>(To Surface Waters)<br>(thousands) | PE Discharged at Selected<br>Option (To Surface<br>Waters)<br>(thousands) | Cost-Effectiveness of<br>Selected Option(s)<br>Beyond BPT<br>(\$/PE removed) |
|---|---|---|--|
| Aluminum Forming                          | 1,602   | 18  | 155  |
| Battery Manufacturing                     | 1,152   | 5   | 15   |
| Cannmaking                                | 252   | 5   | 38   |
| Centralized Waste Treatment <sup>c</sup>  | 689   | 328-330   | 70-110   |
| Coal Mining                               | NA  | NA  | NA <sup>c</sup>  |
| Coil Coating                              | 2,503   | 10  | 10   |
| Copper Forming                            | 934   | 4   | 10   |
| Electronics I                             | 75  | 35  | 14   |
| Electronics II                            | 260   | 24  | 14   |
| Foundries                                 | 2,136   | 18  | 116  |
| Inorganic Chemicals I                     | 3,971   | 3,004   | 9  |
| Inorganic Chemicals II                    | 4,760   | 6   | <1   |
| Iron & Steel                              | 5,599   | 1,404   | 6  |
| Leather Tanning                           | 16,830  | 1,899   | 111  |
| Metal Finishing                           | 11,680  | 755   | 10   |
| Metal Products and Machinery <sup>c</sup> | 1,115   | 234   | 127  |
| Nonferrous Metals Forming                 | 189   | 5   | 90   |
| Nonferrous Metals Mfg I                   | 3,187   | 19  | 15   |
| Nonferrous Metals Mfg II                  | 38  | 0.41  | 12   |
| Organic Chemicals                         | 5,210   | 72  | 34   |
| Pesticide Manufacturing                   | 257   | 19  | 18   |
| Pesticide Formulating                     | 7,746   | 112   | <3   |
| Pharmaceuticals <sup>c</sup>              | 340   | 63  | 1  |
| Plastics Molding & Forming                | NA  | NA  | NA   |
| Porcelain Enameling                       | 1,565   | 96  | 14   |
| Pulp & Paper <sup>c</sup>                 | 9,539   | 103   | 65   |
| Transportation Equipment Cleaning         | 426   | 383   | 185  |

<sup>a</sup>Although toxic weighting factors for priority pollutants varied across these rules, this table reflects the cost-effectiveness at the time of regulation.

<sup>b</sup>No known indirect dischargers at this time for offshore oil and gas and coastal oil and gas.

<sup>c</sup>Proposed.

## **SECTION 6**

### **COST-REASONABLENESS OF CONVENTIONAL POLLUTANTS REMOVED**

#### **6.1 BCT COST-REASONABLENESS TEST**

EPA evaluates the cost-reasonableness of control technologies for conventional pollutants for direct dischargers using the Best Conventional Pollutant Control Technology (BCT) cost test. After setting Best Practicable Control Technology (BPT), EPA uses the BCT cost test to evaluate whether it can set BCT at a more stringent level. The test evaluates the cost-reasonableness of BCT options compared to BPT options. Like BPT, BCT applies only to direct dischargers.

The test is composed of two parts, the POTW test and the industry cost-effectiveness test. A pollution control technology must pass both parts in order to pass the test. If it does not pass, then BCT limitations are set at a level equal to BPT limitations. This is also done if there are no candidate technologies for BCT at a more stringent level than BPT. In the latter case, the BCT cost test is not performed.

##### **6.1.1 POTW Test**

The POTW test compares the incremental cost of removals incurred by switching from BPT to BCT against the cost of upgrading POTWs from secondary to advanced secondary treatment. In order to pass this test, the incremental cost for the TEC industry to comply with BCT (measured in dollars per pound of conventional pollutants removed) must be less than the cost of upgrading POTWs to achieve similar removals. This benchmark cost for POTWs is set at \$0.56 in 1994 dollars. Cost per pound of conventional pollutant removals is calculated as:

$$\text{Cost per Pound} = \text{Pre Tax Annualized Cost} / \text{Pounds Removed}$$

To pass this part of the test, the TEC industry cost per pound removed must be less than \$0.56.

### **6.1.2 Industry Ratio Test**

The industry cost-effectiveness test compares the rate of cost increase for an industry to move from BPT to BCT to the rate of cost increase for POTWs to upgrade from secondary to advanced secondary treatment. To pass this test, the rate of cost increase for the industry must be less than the rate of cost increase associated with upgrading POTWs. This rate is benchmarked at 1.29. In effect, this part of the test requires that the cost of removals must increase by less than 29% in moving from BPT to BCT. The industry cost-effectiveness is calculated as the ratio of the incremental cost of BCT to the incremental cost of BPT (which is incremental from the baseline level of treatment):

$$\text{Industry Cost-Effectiveness} = \text{BCT Incremental Cost per Pound} / \text{BPT Incremental Cost per Pound}$$

## **6.2 SUBCATEGORY BCT TESTS**

The following seven tables present the cost-reasonableness of BCT options by subcategory for the TEC industry effluent guidelines. All costs are presented in 1994 dollars. Each table presents figures based on a combination of monthly and weekly monitoring.

For three subcategories—Truck Food, Rail Food, and Barge Food—all facilities in the detailed questionnaire database are indirect dischargers; however, EPA believes direct dischargers, though rare, do exist in these subcategories, and identified several direct dischargers in the screener questionnaire database. This analysis assumes that direct discharger facilities in these subcategories have the same characteristics as the indirect dischargers in the detailed questionnaire database; therefore, facility data for indirect dischargers can be used as a proxy for direct dischargers. To accurately represent direct dischargers in calculating pounds removed, the POTW removal factors were deleted.

For two subcategories—Truck Chemical and Rail Chemical—all facilities in the detailed questionnaire database are indirect dischargers; nonetheless, direct dischargers were identified in the screener questionnaire database. EPA performed this analysis on the facilities identified from the screener survey.

### **6.2.1 Truck Food**

Table 6-1 presents the results of the BCT cost test for direct dischargers in the Truck Food subcategory. Two technology options for direct dischargers exist in this subcategory (see Table 3-1). The cost per pound ranges from \$0.0006 under Option 2 to \$0.0799 under Option 1. The incremental cost per pound is \$0.0003 under Option 2. The BCT test was not performed for this subcategory because EPA chose Option 2 for the candidate BPT, and there are no more stringent candidate technologies for BCT. EPA has set Option 2 for BPT and BCT for this subcategory.

### **6.2.2 Rail Food**

Table 6-2 presents the results of the BCT cost test for direct dischargers in the Rail Food subcategory. Two technology options for direct dischargers exist in this subcategory (see Table 3-1). The cost per pound ranges from \$0.13 under Option 2 to \$32,539.92 under Option 1. The incremental cost per pound is \$0.07 under Option 2. The BCT test was not performed for this subcategory because EPA chose Option 2 for the candidate BPT, and there are no more stringent candidate technologies for BCT. EPA has set Option 2 for BPT and BCT for this subcategory.

### **6.2.3 Barge Food**

Table 6-3 presents the results of the BCT cost test for direct dischargers in the Barge Food subcategory. Two technology options for direct dischargers exist in this subcategory (see Table 3-1). The cost per pound is undefined under Option 1 because no pounds of conventional pollutants were removed, and is \$0.003 under Option 2. The incremental cost per pound is \$0.001 under Option 2. The BCT test was not performed for this subcategory because EPA chose Option 2 for the candidate BPT, and there are no more stringent candidate technologies for BCT. EPA has set Option 2 for BPT and BCT for this subcategory.

TABLE 6-1

**COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS**  
**TRUCK FOOD SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                     |                |                         | Incremental                      |                |                         | Industry Cost-Effectiveness Test |
|-------------------|----------------------------------|----------------|-------------------------|----------------------------------|----------------|-------------------------|----------------------------------|
|                   | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) |                                  |
| Option 1          | \$5,721,343                      | 71,580,474     | \$0.0799                | \$5,721,343                      | 71,580,474     | \$0.0799                | NA                               |
| Option 2          | \$12,016,630                     | 21,144,967,819 | \$0.0006                | \$6,295,287                      | 21,073,387,344 | \$0.0003                | NA                               |

NA: Not applicable because Option 2 = BPT.

Industry Cost-Effectiveness Test = BCT Incremental Cost per Pound/BPT Incremental Cost per Pound

Two-part BCT Cost Test:

(a) BCT \$1994 Incremental Cost per Pound < \$0.56

(b) Industry Cost-Effectiveness < 1.29

TABLE 6-2

**COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS**  
**RAIL FOOD SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                     |                |                         | Incremental                      |                |                         | Industry Cost-Effectiveness Test | BCT Cost Test |
|-------------------|----------------------------------|----------------|-------------------------|----------------------------------|----------------|-------------------------|----------------------------------|---------------|
|                   | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) |                                  |               |
| Option 1          | ND                               | ND             | \$32,539.92             | ND                               | ND             | \$32,539.92             | NA                               | NA            |
| Option 2          | ND                               | ND             | \$0.13                  | ND                               | ND             | \$0.07                  | NA                               | NA            |

NA: Not applicable because Option 2 = BPT.

ND: Not disclosed due to business confidentiality.

Industry Cost-Effectiveness Test = BCT Incremental Cost per Pound/BPT Incremental Cost per Pound  
 Two-part BCT Cost Test:

- (a) BCT \$1994 Incremental Cost per Pound < \$0.56
- (b) Industry Cost-Effectiveness < 1.29

**TABLE 6-3**  
**COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS**  
**BARGE FOOD SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                     |                |                         | Incremental                      |                |                         | Industry Cost-Effectiveness Test | BCT Cost Test |
|-------------------|----------------------------------|----------------|-------------------------|----------------------------------|----------------|-------------------------|----------------------------------|---------------|
|                   | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) |                                  |               |
| Option 1          | \$43,633                         | 0              | *                       | \$43,633                         | 0              | *                       | NA                               | NA            |
| Option 2          | \$64,073                         | 19,081,180     | \$0.003                 | \$20,439                         | 19,081,180     | \$0.001                 | NA                               | NA            |

\* Incremental cost per pound is undefined since there are no incremental pollutant removals.

NA: Not applicable because Option 2 = BPT.

Industry Cost-Effectiveness Test = BCT Incremental Cost per Pound/BPT Incremental Cost per Pound

Two-part BCT Cost Test:

(a) BCT \$1994 Incremental Cost per Pound < \$0.56

(b) Industry Cost-Effectiveness < 1.29

#### **6.2.4 Truck Chemical**

Table 6-4 presents the results of the BCT cost test for direct dischargers in the Truck Chemical subcategory. Two technology options for direct dischargers exist in this subcategory (see Table 3-1). Costs and removals were not calculated for Option 1. The cost per pound is \$0.48 under Option 2. The BCT test was not performed for this subcategory because EPA chose Option 2 for the candidate BPT, and there are no more stringent candidate technologies for BCT. EPA has set Option 2 for BPT and BCT for this subcategory.

#### **6.2.5 Rail Chemical**

Table 6-5 presents the results of the BCT cost test for direct dischargers in the Rail Chemical subcategory. Three technology options for direct dischargers exist in this subcategory (see Table 3-1). The cost per pound ranges from \$35.55 under Option 2 to \$96.87 under Option 1. The incremental cost per pound is \$20.66 under Option 2 and \$27.81 under Option 3. The industry cost-effectiveness ratio ranges from 0.21 with Option 1 as BPT and Option 2 as BCT to 0.29 with Option 1 as BPT and Option 3 as BCT. Both Option 2 and Option 3 fail the POTW test and, consequently, fail the BCT cost test. EPA has set Option 1 for BPT and BCT for this subcategory.

#### **6.2.6 Barge Chemical and Petroleum**

Table 6-6 presents the results of the BCT cost test for direct dischargers in the Barge Chemical and Petroleum subcategory. Two technology options for direct dischargers exist in this subcategory (see Table 3-1). The cost per pound ranges from \$0.35 under Option 1 to \$0.39 under Option 2. The incremental cost per pound is \$1.64 under Option 2. The industry cost-effectiveness ratio is 4.73 with Option 1 as BPT and Option 2 as BCT. Option 2 fails the BCT cost test; it passes neither the POTW test nor the industry cost-effectiveness test. EPA has set Option 1 for BPT and BCT for this subcategory.

TABLE 6-4

**COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS**  
**TRUCK CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                     |                |                         | Incremental                      |                |                         | Industry Cost-Effectiveness Test | BCT Cost Test |
|-------------------|----------------------------------|----------------|-------------------------|----------------------------------|----------------|-------------------------|----------------------------------|---------------|
|                   | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) |                                  |               |
| Option 1 *        | ND                               | ND             | \$0.48                  | ND                               | ND             | \$0.48                  | NA                               | NA            |
| Option 2          | ND                               | ND             | \$0.48                  | ND                               | ND             | \$0.48                  | NA                               | NA            |

NA: Not applicable because Option 2 = BPT.

ND: Not disclosed due to business confidentiality.

Industry Cost-Effectiveness Test = BCT Incremental Cost per Pound/BPT Incremental Cost per Pound

Two-part BCT Cost Test:

(a) BCT \$1994 Incremental Cost per Pound < \$0.56

(b) Industry Cost-Effectiveness < 1.29

TABLE 6-5

**COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS**  
**RAIL CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                     |                |                         | Incremental                      |                          |                         | Industry Cost-Effectiveness Test |  |
|-------------------|----------------------------------|----------------|-------------------------|----------------------------------|--------------------------|-------------------------|----------------------------------|--|
|                   | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) | Pre-tax Annualized Cost (\$1994) |                          | Cost per Pound (\$1994) |                                  |  |
|                   |                                  |                |                         | Removed                          | Annualized Cost (\$1994) |                         |                                  |  |
| Option 1          | ND                               | ND             | \$96.87                 |                                  | ND                       | ND                      | \$96.87                          |  |
| Option 2          | ND                               | ND             | \$35.55                 |                                  | ND                       | ND                      | \$20.66                          |  |
| Option 1          | ND                               | ND             | \$96.87                 |                                  | ND                       | ND                      | \$96.87                          |  |
| Option 3          | ND                               | ND             | \$40.53                 |                                  | ND                       | ND                      | \$27.81                          |  |

ND: Not disclosed due to business confidentiality.

Industry Cost-Effectiveness Test = BCT Incremental Cost per Pound/BPT Incremental Cost per Pound  
 Two-part BCT Cost Test:

- (a) BCT \$1994 Incremental Cost per Pound < \$0.56
- (b) Industry Cost-Effectiveness < 1.29

TABLE 6-6

**COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS**  
**BARGE CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                     |                |                         | Incremental                      |                |                         | Industry Cost-Effectiveness Test |
|-------------------|----------------------------------|----------------|-------------------------|----------------------------------|----------------|-------------------------|----------------------------------|
|                   | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) |                                  |
|                   |                                  |                |                         |                                  |                |                         |                                  |
| Option 1          | \$2,199,476                      | 6,353,309      | \$0.35                  | \$2,199,476                      | 6,353,309      | \$0.35                  |                                  |
| Option 2          | \$2,567,550                      | 6,578,143      | \$0.39                  | \$368,074                        | 224,834        | \$1.64                  | 4.73                             |

Industry Cost-Effectiveness Test = BCT Incremental Cost per Pound/BPT Incremental Cost per Pound

Two-part BCT Cost Test:

(a) BCT \$1994 Incremental Cost per Pound < \$0.56

(b) Industry Cost-Effectiveness < 1.29

### **6.2.7 Barge Hopper**

Table 6-7 presents the results of the BCT cost test for direct dischargers in the Barge Hopper subcategory. One technology option for direct dischargers exists in this subcategory (see Table 3-1). The cost per pound is \$13.57 under Option 1. The BCT test was not performed for this subcategory because EPA chose Option 1 for the candidate BPT, and there are no more stringent candidate technologies for BCT. EPA has chosen not to set BPT or BCT for this subcategory.

TABLE 6-7

**COST-EFFECTIVENESS AND BCT COST TEST FOR CONVENTIONAL POLLUTANTS**  
**BARGE HOPPER SUBCATEGORY**  
**DIRECT DISCHARGERS**  
**COMBINATION MONTHLY/WEEKLY MONITORING**

| Technology Option | Total Annual                     |                |                         | Incremental                      |                |                         | Industry Cost-Effectiveness Test | BCT Cost Test |
|-------------------|----------------------------------|----------------|-------------------------|----------------------------------|----------------|-------------------------|----------------------------------|---------------|
|                   | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) | Pre-tax Annualized Cost (\$1994) | Pounds Removed | Cost per Pound (\$1994) |                                  |               |
| Option 1          | \$117,056                        | 8,626          | \$13.57                 | \$117,056                        | 8,626          | \$13.57                 | NA                               | NA            |

NA: Not applicable because Option 1 = BPT.  
 Industry Cost-Effectiveness Test = BCT Incremental Cost per Pound  
 Two-part BCT Cost Test:  
 (a) BCT \$1994 Incremental Cost per Pound < \$0.56  
 (b) Industry Cost-Effectiveness < 1.29

## **SECTION 7**

### **REFERENCES**

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**APPENDIX A**

**SUPPORTING DOCUMENTATION FOR  
COST-EFFECTIVENESS ANALYSIS:  
POLLUTANT LOADINGS AND POUND EQUIVALENTS REMOVED**

**A-2**

TABLE A-1

**PRIORITY NONCONVENTIONAL POLLUTANT REMOVALS UNDER SELECTED OPTIONS  
INDUSTRY TOTALS**

| Subcategory      | Pounds  |          |         | Pound Equivalents (PEs) |           |           |
|------------------|---------|----------|---------|-------------------------|-----------|-----------|
|                  | Direct  | Indirect | Total   | Direct                  | Indirect  | Total     |
| Truck Chemical * | ND      | 717,165  | ND      | ND                      | 171,485.9 | ND        |
| Rail Chemical *  | ND      | 23,043   | ND      | ND                      | 20,825.6  | ND        |
| Barge Chemical   | 218,579 | NA       | 218,579 | 13,856.1                | NA        | 13,856.1  |
| Truck Petroleum  | NA      | NA       | 0       | NA                      | NA        | 0.0       |
| Rail Petroleum   | NA      | NA       | 0       | NA                      | NA        | 0.0       |
| Truck Food       | NA      | NA       | 0       | NA                      | NA        | 0.0       |
| Rail Food        | NA      | NA       | 0       | NA                      | NA        | 0.0       |
| Barge Food       | NA      | NA       | 0       | NA                      | NA        | 0.0       |
| Truck Hopper     | NA      | NA       | 0       | NA                      | NA        | 0.0       |
| Rail Hopper      | NA      | NA       | 0       | NA                      | NA        | 0.0       |
| Barge Hopper     | NA      | NA       | 0       | NA                      | NA        | 0.0       |
| Industry Total   | 218,728 | 740,208  | 958,936 | 14,399.2                | 192,311.4 | 206,710.6 |

\* Pollutants directly discharged are unweighted because direct dischargers were identified only in the screener questionnaire.

ND: Not disclosed due to business confidentiality.

NA: Not applicable.

**TABLE A-2**  
**POLLUTANT REMOVALS**  
**TRUCK CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical                     | Pollutants Removed<br>(grams) |                  | Conversion Factors | Pound Equivalents<br>Removed |          |
|------------------------------|-------------------------------|------------------|--------------------|------------------------------|----------|
|                              | Option 1                      | Grams/<br>Pounds |                    | Toxic<br>Weighting<br>Factor | Option 1 |
| Acetone                      | ND                            | 2.21E-03         | 7.60E-06           |                              | ND       |
| Benzene                      | ND                            | 2.21E-03         | 1.80E-02           |                              | ND       |
| Chloroform                   | ND                            | 2.21E-03         | 2.10E-03           |                              | ND       |
| 1,2-Dichloroethane           | ND                            | 2.21E-03         | 6.20E-03           |                              | ND       |
| Ethylbenzene                 | ND                            | 2.21E-03         | 1.40E-03           |                              | ND       |
| Methyl ethyl ketone          | ND                            | 2.21E-03         | 2.20E-05           |                              | ND       |
| Methyl isobutyl ketone       | ND                            | 2.21E-03         | 1.20E-04           |                              | ND       |
| Methylene chloride           | ND                            | 2.21E-03         | 4.20E-04           |                              | ND       |
| Tetrachloroethylene          | ND                            | 2.21E-03         | 7.40E-02           |                              | ND       |
| Toluene                      | ND                            | 2.21E-03         | 5.60E-03           |                              | ND       |
| 1,1,1-Trichloroethane        | ND                            | 2.21E-03         | 4.30E-03           |                              | ND       |
| Trichloroethylene            | ND                            | 2.21E-03         | 6.30E-02           |                              | ND       |
| m-Xylene                     | ND                            | 2.21E-03         | 1.50E-03           |                              | ND       |
| o+p-Xylene                   | ND                            | 2.21E-03         | 8.50E-03           |                              | ND       |
| alpha-Terpineol              | ND                            | 2.21E-03         | 1.00E-03           |                              | ND       |
| Benzoic acid                 | ND                            | 2.21E-03         | 3.30E-04           |                              | ND       |
| Benzyl alcohol               | ND                            | 2.21E-03         | 5.60E-03           |                              | ND       |
| bis (2-Ethylhexyl) phthalate | ND                            | 2.21E-03         | 1.10E-01           |                              | ND       |
| 2-Chlorophenol               | ND                            | 2.21E-03         | 3.30E-02           |                              | ND       |
| o-Cresol                     | ND                            | 2.21E-03         | 3.30E-03           |                              | ND       |
| p-Cresol                     | ND                            | 2.21E-03         | 2.40E-03           |                              | ND       |
| p-Cymene                     | ND                            | 2.21E-03         | 4.30E-02           |                              | ND       |
| n-Decane                     | ND                            | 2.21E-03         | 4.30E-03           |                              | ND       |
| 1,2-Dichlorobenzene          | ND                            | 2.21E-03         | 1.10E-02           |                              | ND       |
| Di-n-octyl phthalate         | ND                            | 2.21E-03         | 2.20E-01           |                              | ND       |
| n-Docosane                   | ND                            | 2.21E-03         | 8.20E-05           |                              | ND       |
| n-Dodecane                   | ND                            | 2.21E-03         | 4.30E-03           |                              | ND       |
| n-Eicosane                   | ND                            | 2.21E-03         | 4.30E-03           |                              | ND       |
| n-Hexacosane                 | ND                            | 2.21E-03         | 8.20E-05           |                              | ND       |
| n-Hexadecane                 | ND                            | 2.21E-03         | 4.30E-03           |                              | ND       |
| 2-Isopropynaphthalene        | ND                            | 2.21E-03         | 9.82E-02           |                              | ND       |
| 2-Methylnaphthalene          | ND                            | 2.21E-03         | 1.80E-02           |                              | ND       |
| Naphthalene                  | ND                            | 2.21E-03         | 1.50E-02           |                              | ND       |
| n-Octadecane                 | ND                            | 2.21E-03         | 4.30E-03           |                              | ND       |
| Styrene                      | ND                            | 2.21E-03         | 1.40E-02           |                              | ND       |
| n-Tetracosane                | ND                            | 2.21E-03         | 8.20E-05           |                              | ND       |
| n-Tetradecane                | ND                            | 2.21E-03         | 4.30E-03           |                              | ND       |
| n-Triacontane                | ND                            | 2.21E-03         | 8.20E-05           |                              | ND       |
| Azinphos ethyl               | ND                            | 2.21E-03         | 5.10E+03           |                              | ND       |
| Azinphos methyl              | ND                            | 2.21E-03         | 2.80E+01           |                              | ND       |
| Coumaphos                    | ND                            | 2.21E-03         | 5.60E+03           |                              | ND       |
| Dichlofenthion               | ND                            | 2.21E-03         | 1.40E+01           |                              | ND       |

TABLE A-2 (continued)

**POLLUTANT REMOVALS**  
**TRUCK CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical                | Pollutants Removed<br>(grams) |                  | Conversion Factors | Pound Equivalents<br>Removed |          |
|-------------------------|-------------------------------|------------------|--------------------|------------------------------|----------|
|                         | Option 1                      | Grams/<br>Pounds |                    | Toxic<br>Weighting<br>Factor | Option 1 |
| Disulfoton              | ND                            | 2.21E-03         | 1.20E+02           |                              | ND       |
| EPN                     | ND                            | 2.21E-03         | 7.60E+02           |                              | ND       |
| Leptophos               | ND                            | 2.21E-03         | 1.10E+01           |                              | ND       |
| Merphos                 | ND                            | 2.21E-03         | 2.50E+01           |                              | ND       |
| Tetrachlorvinphos       | ND                            | 2.21E-03         | 1.40E-01           |                              | ND       |
| Beta-BHC                | ND                            | 2.21E-03         | 1.20E+01           |                              | ND       |
| Gamma-BHC               | ND                            | 2.21E-03         | 7.00E+01           |                              | ND       |
| Gamma-Chlordane         | ND                            | 2.21E-03         | 2.30E+03           |                              | ND       |
| Chlorobenzilate         | ND                            | 2.21E-03         | 1.60E-01           |                              | ND       |
| 4,4'-DDT                | ND                            | 2.21E-03         | 6.50E+03           |                              | ND       |
| Diallate                | ND                            | 2.21E-03         | 8.40E-03           |                              | ND       |
| Dieldrin                | ND                            | 2.21E-03         | 5.70E+04           |                              | ND       |
| Endosulfan II           | ND                            | 2.21E-03         | 1.00E+02           |                              | ND       |
| Endosulfan Sulfate      | ND                            | 2.21E-03         | 1.00E+02           |                              | ND       |
| Nitrofen                | ND                            | 2.21E-03         | 4.80E-02           |                              | ND       |
| Pentachloronitrobenzene | ND                            | 2.21E-03         | 2.70E-01           |                              | ND       |
| Simazine                | ND                            | 2.21E-03         | 5.60E-01           |                              | ND       |
| Terbutylazine           | ND                            | 2.21E-03         | 1.20E-02           |                              | ND       |
| 2,4-D                   | ND                            | 2.21E-03         | 3.10E-03           |                              | ND       |
| Dalapon                 | ND                            | 2.21E-03         | 5.10E-03           |                              | ND       |
| 2,4-DB (Butoxon)        | ND                            | 2.21E-03         | 3.60E-02           |                              | ND       |
| Dinoseb                 | ND                            | 2.21E-03         | 1.90E+00           |                              | ND       |
| MCPA                    | ND                            | 2.21E-03         | 1.60E-02           |                              | ND       |
| MCPP                    | ND                            | 2.21E-03         | 6.90E-03           |                              | ND       |
| Picloram                | ND                            | 2.21E-03         | 2.10E+00           |                              | ND       |
| 2,4,5-T                 | ND                            | 2.21E-03         | 2.80E-01           |                              | ND       |
| 2,4,5-TP                | ND                            | 2.21E-03         | 1.80E-01           |                              | ND       |
| Aluminum                | ND                            | 2.21E-03         | 6.40E-02           |                              | ND       |
| Boron                   | ND                            | 2.21E-03         | 1.80E-01           |                              | ND       |
| Chromium                | ND                            | 2.21E-03         | 2.70E-02           |                              | ND       |
| Copper                  | ND                            | 2.21E-03         | 4.70E-01           |                              | ND       |
| Manganese               | ND                            | 2.21E-03         | 1.40E-02           |                              | ND       |
| Mercury                 | ND                            | 2.21E-03         | 5.00E+02           |                              | ND       |
| Tin                     | ND                            | 2.21E-03         | 3.00E-01           |                              | ND       |
| Titanium                | ND                            | 2.21E-03         | 2.90E-02           |                              | ND       |
| Zinc                    | ND                            | 2.21E-03         | 5.10E-02           |                              | ND       |
| Fluoride                | ND                            | 2.21E-03         | 3.50E-02           |                              | ND       |
| Total Cyanide           | ND                            | 2.21E-03         | 1.10E+00           |                              | ND       |
| Total                   | ND                            |                  |                    | ND                           |          |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

**TABLE A-3**  
**POLLUTANT REMOVALS**  
**TRUCK CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                     | Pollutants Removed (grams) |            | Conversion Factors |                              |                           | Pound Equivalents Removed |          |
|------------------------------|----------------------------|------------|--------------------|------------------------------|---------------------------|---------------------------|----------|
|                              | Option 1                   | Option 2   | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor | POTW<br>Removal<br>Factor | Option 1                  | Option 2 |
| Acetone                      | 5,339,900                  | 77,546,967 | 2.21E-03           | 7.60E-06                     | 1.63E-01                  | 0.0                       | 0.2      |
| Benzene                      | 47,644                     | 47,644     | 2.21E-03           | 1.80E-02                     | 5.24E-02                  | 0.1                       | 0.1      |
| Chloroform                   | 86,035                     | 86,035     | 2.21E-03           | 2.10E-03                     | 2.66E-01                  | 0.1                       | 0.1      |
| 1,2-Dichloroethane           | 872,084                    | 1,069,385  | 2.21E-03           | 6.20E-03                     | 1.10E-01                  | 1.3                       | 1.6      |
| Ethylbenzene                 | 694,101                    | 922,804    | 2.21E-03           | 1.40E-03                     | 6.21E-02                  | 0.1                       | 0.2      |
| Methyl ethyl ketone          | 959,988                    | 13,319,798 | 2.21E-03           | 2.20E-05                     | 8.17E-02                  | 0.0                       | 0.1      |
| Methyl isobutyl ketone       | 2,126,203                  | 4,691,831  | 2.21E-03           | 1.20E-04                     | 1.21E-01                  | 0.1                       | 0.2      |
| Methylene chloride           | 11,277,856                 | 28,216,148 | 2.21E-03           | 4.20E-04                     | 4.57E-01                  | 4.8                       | 12.0     |
| Tetrachloroethylene          | 1,895,281                  | 2,056,639  | 2.21E-03           | 7.40E-02                     | 1.54E-01                  | 47.7                      | 51.8     |
| Toluene                      | 2,675,315                  | 3,618,728  | 2.21E-03           | 5.60E-03                     | 3.82E-02                  | 1.3                       | 1.7      |
| 1,1,1-Trichloroethane        | 1,166,864                  | 1,328,083  | 2.21E-03           | 4.30E-03                     | 9.55E-02                  | 1.1                       | 1.2      |
| Trichloroethylene            | 25,246                     | 25,246     | 2.21E-03           | 6.30E-02                     | 1.30E-01                  | 0.5                       | 0.5      |
| m-Xylene                     | 3,323,103                  | 3,718,177  | 2.21E-03           | 1.50E-03                     | 3.46E-01                  | 3.8                       | 4.3      |
| o+p-Xylene                   | 1,696,641                  | 1,941,937  | 2.21E-03           | 8.50E-03                     | 4.93E-02                  | 1.6                       | 1.8      |
| alpha-Terpineol              | 87,218                     | 777,520    | 2.21E-03           | 1.00E-03                     | 5.40E-02                  | 0.0                       | 0.1      |
| Benzoic acid                 | 4,440,034                  | 43,439,088 | 2.21E-03           | 3.30E-04                     | 1.95E-01                  | 0.6                       | 6.2      |
| Benzyl alcohol               | 462,452                    | 462,452    | 2.21E-03           | 5.60E-03                     | 2.20E-01                  | 1.3                       | 1.3      |
| bis (2-Ethylhexyl) phthalate | 885,667                    | 885,667    | 2.21E-03           | 1.10E-01                     | 4.02E-01                  | 86.6                      | 86.6     |
| 2-Chlorophenol               | 96,988                     | 96,988     | 2.21E-03           | 3.30E-02                     | 5.00E-02                  | 0.4                       | 0.4      |
| o-Cresol                     | 119,379                    | 119,379    | 2.21E-03           | 3.30E-03                     | 4.75E-01                  | 0.4                       | 0.4      |
| p-Cresol                     | 13,203                     | 212,386    | 2.21E-03           | 2.40E-03                     | 2.83E-01                  | 0.0                       | 0.3      |
| p-Cymene                     | 88,348                     | 88,348     | 2.21E-03           | 4.30E-02                     | 2.10E-03                  | 0.0                       | 0.0      |
| n-Decane                     | 609,225                    | 609,225    | 2.21E-03           | 4.30E-03                     | 9.10E-01                  | 5.3                       | 5.3      |
| 1,2-Dichlorobenzene          | 166,571                    | 166,571    | 2.21E-03           | 1.10E-02                     | 1.10E-01                  | 0.4                       | 0.4      |
| Di-n-octyl phthalate         | 289,842                    | 289,842    | 2.21E-03           | 2.20E-01                     | 1.70E-01                  | 24.0                      | 24.0     |
| n-Docosane                   | 177,778                    | 177,778    | 2.21E-03           | 8.20E-05                     | 1.20E-01                  | 0.0                       | 0.0      |
| n-Dodecane                   | 1,953,996                  | 1,953,996  | 2.21E-03           | 4.30E-03                     | 4.95E-02                  | 0.9                       | 0.9      |
| n-Eicosane                   | 496,207                    | 496,207    | 2.21E-03           | 4.30E-03                     | 7.60E-02                  | 0.4                       | 0.4      |
| n-Hexacosane                 | 245,016                    | 245,016    | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0                       | 0.0      |
| n-Hexadecane                 | 1,225,579                  | 1,225,579  | 2.21E-03           | 4.30E-03                     | 2.89E-01                  | 3.4                       | 3.4      |
| 2-Isopropylnaphthalene       | 312,255                    | 312,255    | 2.21E-03           | 9.80E-02                     | 7.20E-01                  | 48.7                      | 48.7     |
| 2-Methylnaphthalene          | 116,143                    | 116,143    | 2.21E-03           | 1.80E-02                     | 7.20E-01                  | 3.3                       | 3.3      |
| Naphthalene                  | 518,448                    | 518,448    | 2.21E-03           | 1.50E-02                     | 5.31E-02                  | 0.9                       | 0.9      |
| n-Octadecane                 | 665,257                    | 665,257    | 2.21E-03           | 4.30E-03                     | 2.89E-01                  | 1.8                       | 1.8      |
| Styrene                      | 4,968,651                  | 6,658,645  | 2.21E-03           | 1.40E-02                     | 6.35E-02                  | 9.8                       | 13.1     |
| n-Tetracosane                | 306,652                    | 306,652    | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0                       | 0.0      |
| n-Tetradecane                | 833,354                    | 833,354    | 2.21E-03           | 4.30E-03                     | 2.89E-01                  | 2.3                       | 2.3      |
| n-Triacontane                | 368,287                    | 368,287    | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0                       | 0.0      |
| Azinphos ethyl               | 3,691                      | 3,691      | 2.21E-03           | 5.10E+03                     | 1.00E+00                  | 41,602.7                  | 41,602.7 |
| Azinphos methyl              | 2,634                      | 2,634      | 2.21E-03           | 2.80E+01                     | 2.60E-01                  | 42.4                      | 42.4     |
| Coumaphos                    | 6,850                      | 6,850      | 2.21E-03           | 5.60E+03                     | 1.00E+00                  | 84,778.6                  | 84,778.6 |
| Dichlofenthion               | 3,098                      | 3,098      | 2.21E-03           | 1.40E+01                     | 1.00E+00                  | 95.8                      | 95.8     |
| Disulfoton                   | 3,073                      | 42,982     | 2.21E-03           | 1.20E+02                     | 1.00E+00                  | 815.0                     | 11,398.9 |
| EPN                          | 6,419                      | 6,419      | 2.21E-03           | 7.60E+02                     | 1.00E+00                  | 10,781.2                  | 10,781.2 |
| Leptophos                    | 8,660                      | 8,660      | 2.21E-03           | 1.10E+01                     | 1.00E+00                  | 210.5                     | 210.5    |
| Merphos                      | 408                        | 3,450      | 2.21E-03           | 2.50E+01                     | 1.00E+00                  | 22.5                      | 190.6    |
| Tetrachlorvinphos            | 2,337                      | 2,337      | 2.21E-03           | 1.40E-01                     | 1.00E+00                  | 0.7                       | 0.7      |
| Beta-BHC                     | 657                        | 657        | 2.21E-03           | 1.20E+01                     | 5.70E-01                  | 9.9                       | 9.9      |
| Gamma-BHC                    | 43                         | 563        | 2.21E-03           | 7.00E+01                     | 4.80E-01                  | 3.2                       | 41.8     |

TABLE A-3 (continued)

**POLLUTANT REMOVALS**  
**TRUCK CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                | Pollutants Removed (grams) |                    | Conversion Factors |                              | Pound Equivalents Removed |                  |
|-------------------------|----------------------------|--------------------|--------------------|------------------------------|---------------------------|------------------|
|                         | Option 1                   | Option 2           | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor | POTW<br>Removal<br>Factor | Option 1         |
| Gamma-Chlordane         | 312                        | 312                | 2.21E-03           | 2.30E+03                     | 5.00E-01                  | 792.4            |
| Chlorobenzilate         | 6,502                      | 6,692              | 2.21E-03           | 1.60E-01                     | 1.00E+00                  | 2.3              |
| 4,4'-DDT                | 545                        | 545                | 2.21E-03           | 6.50E+03                     | 4.00E-01                  | 3,131.9          |
| Diallate                | 22,734                     | 39,515             | 2.21E-03           | 8.40E-03                     | 1.00E+00                  | 0.4              |
| Dieldrin                | 240                        | 240                | 2.21E-03           | 5.70E+04                     | 1.40E-01                  | 4,240.4          |
| Endosulfan II           | 5,451                      | 5,451              | 2.21E-03           | 1.00E+02                     | 5.00E-01                  | 602.3            |
| Endosulfan Sulfate      | 545                        | 545                | 2.21E-03           | 1.00E+02                     | 4.20E-01                  | 50.6             |
| Nitrofen                | 1,146                      | 1,146              | 2.21E-03           | 4.80E-02                     | 1.00E+00                  | 0.1              |
| Pentachloronitrobenzene | 13,412                     | 13,412             | 2.21E-03           | 2.70E-01                     | 1.00E+00                  | 8.0              |
| Simazine                | 50,330                     | 50,330             | 2.21E-03           | 5.60E-01                     | 1.00E+00                  | 62.3             |
| Terbutylazine           | 27,814                     | 27,814             | 2.21E-03           | 1.20E-02                     | 1.00E+00                  | 0.7              |
| 2,4-D                   | 771                        | 771                | 2.21E-03           | 3.10E-03                     | 5.10E-01                  | 0.0              |
| Dalapon                 | 163                        | 1,912              | 2.21E-03           | 5.10E-03                     | 1.00E+00                  | 0.0              |
| 2,4-DB (Butoxon)        | 2,045                      | 15,679             | 2.21E-03           | 3.60E-02                     | 1.00E+00                  | 0.2              |
| Dinoseb                 | 464                        | 464                | 2.21E-03           | 1.90E+00                     | 1.00E+00                  | 1.9              |
| MCPA                    | 602,972                    | 893,365            | 2.21E-03           | 1.60E-02                     | 1.00E+00                  | 21.3             |
| MCPP                    | 32,352                     | 302,355            | 2.21E-03           | 6.90E-03                     | 1.00E+00                  | 0.5              |
| Picloram                | 1,717                      | 1,717              | 2.21E-03           | 2.10E+00                     | 1.00E+00                  | 8.0              |
| 2,4,5-T                 | 505                        | 505                | 2.21E-03           | 2.80E-01                     | 4.40E-01                  | 0.1              |
| 2,4,5-TP                | 618                        | 618                | 2.21E-03           | 1.80E-01                     | 5.60E-01                  | 0.1              |
| Aluminum                | 9,701,403                  | 12,037,074         | 2.21E-03           | 6.40E-02                     | 1.20E-01                  | 164.7            |
| Boron                   | 600,194                    | 10,322,761         | 2.21E-03           | 1.80E-01                     | 7.70E-01                  | 183.8            |
| Chromium                | 3,348,407                  | 3,348,407          | 2.21E-03           | 2.70E-02                     | 3.30E-01                  | 65.9             |
| Copper                  | 358,712                    | 358,712            | 2.21E-03           | 4.70E-01                     | 1.60E-01                  | 59.6             |
| Manganese               | 310,770                    | 310,770            | 2.21E-03           | 1.40E-02                     | 5.90E-01                  | 5.7              |
| Mercury                 | 2,518                      | 2,577              | 2.21E-03           | 5.00E+02                     | 4.00E-01                  | 1,113.2          |
| Tin                     | 2,219,944                  | 27,404,992         | 2.21E-03           | 3.00E-01                     | 3.50E-01                  | 515.1            |
| Titanium                | 312,691                    | 312,691            | 2.21E-03           | 2.90E-02                     | 3.12E-01                  | 6.3              |
| Zinc                    | 1,001,177                  | 1,001,177          | 2.21E-03           | 5.10E-02                     | 2.20E-01                  | 24.9             |
| Fluoride                | 3,785,250                  | 68,308,331         | 2.21E-03           | 3.50E-02                     | 3.90E-01                  | 114.2            |
| Total Cyanide           | 3,482                      | 42,227             | 2.21E-03           | 1.10E+00                     | 2.96E-01                  | 2.5              |
| <b>Total</b>            | <b>74,085,872</b>          | <b>324,508,954</b> |                    |                              | <b>149,794.8</b>          | <b>171,485.9</b> |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

**TABLE A-4**  
**POLLUTANT REMOVALS**  
**RAIL CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical             | Pollutants Removed (grams) |          |          | Conversion Factors |                              | Pound Equivalents Removed |          |          |
|----------------------|----------------------------|----------|----------|--------------------|------------------------------|---------------------------|----------|----------|
|                      | Option 1                   | Option 2 | Option 3 | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor | Option 1                  | Option 2 | Option 3 |
| Acetone              | ND                         | ND       | ND       | 2.21E-03           | 7.60E-06                     | ND                        | ND       | ND       |
| Ethylbenzene         | ND                         | ND       | ND       | 2.21E-03           | 1.40E-03                     | ND                        | ND       | ND       |
| Methyl ethyl ketone  | ND                         | ND       | ND       | 2.21E-03           | 2.20E-05                     | ND                        | ND       | ND       |
| m-Xylene             | ND                         | ND       | ND       | 2.21E-03           | 1.50E-03                     | ND                        | ND       | ND       |
| o+p-Xylene           | ND                         | ND       | ND       | 2.21E-03           | 8.50E-03                     | ND                        | ND       | ND       |
| Anthracene           | ND                         | ND       | ND       | 2.21E-03           | 2.50E+00                     | ND                        | ND       | ND       |
| Benzoic acid         | ND                         | ND       | ND       | 2.21E-03           | 3.30E-04                     | ND                        | ND       | ND       |
| Biphenyl             | ND                         | ND       | ND       | 2.21E-03           | 3.70E-02                     | ND                        | ND       | ND       |
| Carbazole            | ND                         | ND       | ND       | 2.21E-03           | 2.70E+01                     | ND                        | ND       | ND       |
| p-Cresol             | ND                         | ND       | ND       | 2.21E-03           | 2.40E-03                     | ND                        | ND       | ND       |
| 2,4-Diaminotoluene   | ND                         | ND       | ND       | 2.21E-03           | 1.80E-01                     | ND                        | ND       | ND       |
| n-Docosane           | ND                         | ND       | ND       | 2.21E-03           | 8.20E-05                     | ND                        | ND       | ND       |
| n-Dodecane           | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                     | ND                        | ND       | ND       |
| n-Eicosane           | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                     | ND                        | ND       | ND       |
| Fluoranthene         | ND                         | ND       | ND       | 2.21E-03           | 9.20E-01                     | ND                        | ND       | ND       |
| n-Hexacosane         | ND                         | ND       | ND       | 2.21E-03           | 8.20E-05                     | ND                        | ND       | ND       |
| n-Hexadecane         | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                     | ND                        | ND       | ND       |
| 2-Methylnaphthalene  | ND                         | ND       | ND       | 2.21E-03           | 1.80E-02                     | ND                        | ND       | ND       |
| 1-Methylphenanthrene | ND                         | ND       | ND       | 2.21E-03           | 1.40E-01                     | ND                        | ND       | ND       |
| Naphthalene          | ND                         | ND       | ND       | 2.21E-03           | 1.50E-02                     | ND                        | ND       | ND       |
| n-Octacosane         | ND                         | ND       | ND       | 2.21E-03           | 8.20E-05                     | ND                        | ND       | ND       |
| n-Octadecane         | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                     | ND                        | ND       | ND       |
| Phenanthrene         | ND                         | ND       | ND       | 2.21E-03           | 1.90E+01                     | ND                        | ND       | ND       |
| Phenol               | ND                         | ND       | ND       | 2.21E-03           | 2.80E-02                     | ND                        | ND       | ND       |
| Pyrene               | ND                         | ND       | ND       | 2.21E-03           | 7.50E-02                     | ND                        | ND       | ND       |
| Styrene              | ND                         | ND       | ND       | 2.21E-03           | 1.40E-02                     | ND                        | ND       | ND       |
| n-Tetracosane        | ND                         | ND       | ND       | 2.21E-03           | 8.20E-05                     | ND                        | ND       | ND       |
| n-Tetradecane        | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                     | ND                        | ND       | ND       |
| n-Triacontane        | ND                         | ND       | ND       | 2.21E-03           | 8.20E-05                     | ND                        | ND       | ND       |
| Dioxathion           | ND                         | ND       | ND       | 2.21E-03           | 6.22E+01                     | ND                        | ND       | ND       |
| Tetrachlorvinphos    | ND                         | ND       | ND       | 2.21E-03           | 1.40E-01                     | ND                        | ND       | ND       |
| Tokuthion            | ND                         | ND       | ND       | 2.21E-03           | 9.30E-03                     | ND                        | ND       | ND       |
| Trichlorfon          | ND                         | ND       | ND       | 2.21E-03           | 7.00E+02                     | ND                        | ND       | ND       |
| Trichloronate        | ND                         | ND       | ND       | 2.21E-03           | 5.60E+03                     | ND                        | ND       | ND       |
| Trimethylphosphate   | ND                         | ND       | ND       | 2.21E-03           | 1.90E-03                     | ND                        | ND       | ND       |
| Acephate             | ND                         | ND       | ND       | 2.21E-03           | 1.30E-02                     | ND                        | ND       | ND       |
| Alachlor             | ND                         | ND       | ND       | 2.21E-03           | 1.60E-02                     | ND                        | ND       | ND       |
| Atrazine             | ND                         | ND       | ND       | 2.21E-03           | 9.40E-02                     | ND                        | ND       | ND       |
| Benefluralin         | ND                         | ND       | ND       | 2.21E-03           | 1.60E-01                     | ND                        | ND       | ND       |
| Alpha-BHC            | ND                         | ND       | ND       | 2.21E-03           | 4.30E+01                     | ND                        | ND       | ND       |
| Beta-BHC             | ND                         | ND       | ND       | 2.21E-03           | 1.20E+01                     | ND                        | ND       | ND       |
| Delta-BHC            | ND                         | ND       | ND       | 2.21E-03           | 8.60E-02                     | ND                        | ND       | ND       |
| Gamma-BHC            | ND                         | ND       | ND       | 2.21E-03           | 7.00E+01                     | ND                        | ND       | ND       |
| Bromacil             | ND                         | ND       | ND       | 2.21E-03           | 5.60E-03                     | ND                        | ND       | ND       |
| Bromoxynil octanoate | ND                         | ND       | ND       | 2.21E-03           | 1.10E+00                     | ND                        | ND       | ND       |
| Butachlor            | ND                         | ND       | ND       | 2.21E-03           | 7.40E-03                     | ND                        | ND       | ND       |
| Captafol             | ND                         | ND       | ND       | 2.21E-03           | 2.70E+00                     | ND                        | ND       | ND       |
| Captan               | ND                         | ND       | ND       | 2.21E-03           | 1.60E+00                     | ND                        | ND       | ND       |
| Carbophenothion      | ND                         | ND       | ND       | 2.21E-03           | 6.60E-01                     | ND                        | ND       | ND       |
| Alpha-Chlordane      | ND                         | ND       | ND       | 2.21E-03           | 2.30E+03                     | ND                        | ND       | ND       |
| Gamma-Chlordane      | ND                         | ND       | ND       | 2.21E-03           | 2.30E+03                     | ND                        | ND       | ND       |
| Chlorobenzilate      | ND                         | ND       | ND       | 2.21E-03           | 1.60E-01                     | ND                        | ND       | ND       |
| Chloroneb            | ND                         | ND       | ND       | 2.21E-03           | 4.70E-03                     | ND                        | ND       | ND       |
| Dacthal (DCPA)       | ND                         | ND       | ND       | 2.21E-03           | 9.50E-03                     | ND                        | ND       | ND       |
| 4,4'-DDD             | ND                         | ND       | ND       | 2.21E-03           | 7.60E+02                     | ND                        | ND       | ND       |

**TABLE A-4 (continued)**  
**POLLUTANT REMOVALS**  
**RAIL CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical                | Pollutants Removed (grams) |          |          | Conversion Factors |                              | Pound Equivalents Removed |          |          |
|-------------------------|----------------------------|----------|----------|--------------------|------------------------------|---------------------------|----------|----------|
|                         | Option 1                   | Option 2 | Option 3 | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor | Option 1                  | Option 2 | Option 3 |
| 4,4'-DDE                | ND                         | ND       | ND       | 2.21E-03           | 9.50E+02                     | ND                        | ND       | ND       |
| 4,4'-DDT                | ND                         | ND       | ND       | 2.21E-03           | 6.50E+03                     | ND                        | ND       | ND       |
| Diallate                | ND                         | ND       | ND       | 2.21E-03           | 8.40E-03                     | ND                        | ND       | ND       |
| Dichlone                | ND                         | ND       | ND       | 2.21E-03           | 4.00E+01                     | ND                        | ND       | ND       |
| Dicofol                 | ND                         | ND       | ND       | 2.21E-03           | 5.70E+02                     | ND                        | ND       | ND       |
| Dieldrin                | ND                         | ND       | ND       | 2.21E-03           | 5.70E+04                     | ND                        | ND       | ND       |
| Endosulfan I            | ND                         | ND       | ND       | 2.21E-03           | 1.00E+02                     | ND                        | ND       | ND       |
| Endosulfan Sulfate      | ND                         | ND       | ND       | 2.21E-03           | 1.00E+02                     | ND                        | ND       | ND       |
| Endrin                  | ND                         | ND       | ND       | 2.21E-03           | 9.80E+01                     | ND                        | ND       | ND       |
| Endrin aldehyde         | ND                         | ND       | ND       | 2.21E-03           | 9.80E+01                     | ND                        | ND       | ND       |
| Endrin ketone           | ND                         | ND       | ND       | 2.21E-03           | 9.80E+01                     | ND                        | ND       | ND       |
| Ethalfluralin           | ND                         | ND       | ND       | 2.21E-03           | 7.50E+00                     | ND                        | ND       | ND       |
| Etriazole               | ND                         | ND       | ND       | 2.21E-03           | 4.60E-03                     | ND                        | ND       | ND       |
| Fenarimol               | ND                         | ND       | ND       | 2.21E-03           | 6.20E-02                     | ND                        | ND       | ND       |
| Heptachlor epoxide      | ND                         | ND       | ND       | 2.21E-03           | 6.80E+03                     | ND                        | ND       | ND       |
| Isodrin                 | ND                         | ND       | ND       | 2.21E-03           | 1.40E+01                     | ND                        | ND       | ND       |
| Isopropalin             | ND                         | ND       | ND       | 2.21E-03           | 5.80E-01                     | ND                        | ND       | ND       |
| Methoxychlor            | ND                         | ND       | ND       | 2.21E-03           | 1.90E+02                     | ND                        | ND       | ND       |
| Metribuzin              | ND                         | ND       | ND       | 2.21E-03           | 1.30E-03                     | ND                        | ND       | ND       |
| Mirex                   | ND                         | ND       | ND       | 2.21E-03           | 5.60E+03                     | ND                        | ND       | ND       |
| Nitrofen                | ND                         | ND       | ND       | 2.21E-03           | 4.80E-02                     | ND                        | ND       | ND       |
| Pendamethalin           | ND                         | ND       | ND       | 2.21E-03           | 1.50E-01                     | ND                        | ND       | ND       |
| Pentachloronitrobenzene | ND                         | ND       | ND       | 2.21E-03           | 2.70E-01                     | ND                        | ND       | ND       |
| CIS-Permethrin          | ND                         | ND       | ND       | 2.21E-03           | 3.40E+00                     | ND                        | ND       | ND       |
| Perthane                | ND                         | ND       | ND       | 2.21E-03           | 1.40E+01                     | ND                        | ND       | ND       |
| Propachlor              | ND                         | ND       | ND       | 2.21E-03           | 3.30E-01                     | ND                        | ND       | ND       |
| Propazine               | ND                         | ND       | ND       | 2.21E-03           | 4.70E-03                     | ND                        | ND       | ND       |
| Simazine                | ND                         | ND       | ND       | 2.21E-03           | 5.60E-01                     | ND                        | ND       | ND       |
| Stobane                 | ND                         | ND       | ND       | 2.21E-03           | 1.10E+02                     | ND                        | ND       | ND       |
| Terbacil                | ND                         | ND       | ND       | 2.21E-03           | 8.00E-01                     | ND                        | ND       | ND       |
| Terbutylazine           | ND                         | ND       | ND       | 2.21E-03           | 1.20E-02                     | ND                        | ND       | ND       |
| Triadimefon             | ND                         | ND       | ND       | 2.21E-03           | 5.80E-03                     | ND                        | ND       | ND       |
| Trifluralin             | ND                         | ND       | ND       | 2.21E-03           | 4.20E+00                     | ND                        | ND       | ND       |
| 2,4-D                   | ND                         | ND       | ND       | 2.21E-03           | 3.10E-03                     | ND                        | ND       | ND       |
| Dalapon                 | ND                         | ND       | ND       | 2.21E-03           | 5.10E-03                     | ND                        | ND       | ND       |
| 2,4-DB (Butoxon)        | ND                         | ND       | ND       | 2.21E-03           | 3.60E-02                     | ND                        | ND       | ND       |
| Dicamba                 | ND                         | ND       | ND       | 2.21E-03           | 1.50E-02                     | ND                        | ND       | ND       |
| Dichloroprop            | ND                         | ND       | ND       | 2.21E-03           | 9.30E-02                     | ND                        | ND       | ND       |
| Dinoseb                 | ND                         | ND       | ND       | 2.21E-03           | 1.90E+00                     | ND                        | ND       | ND       |
| MCPA                    | ND                         | ND       | ND       | 2.21E-03           | 1.60E-02                     | ND                        | ND       | ND       |
| CPP                     | ND                         | ND       | ND       | 2.21E-03           | 6.90E-03                     | ND                        | ND       | ND       |
| Picloram                | ND                         | ND       | ND       | 2.21E-03           | 2.10E+00                     | ND                        | ND       | ND       |
| 2,4,5-T                 | ND                         | ND       | ND       | 2.21E-03           | 2.80E-01                     | ND                        | ND       | ND       |
| 2,4,5-TP                | ND                         | ND       | ND       | 2.21E-03           | 1.80E-01                     | ND                        | ND       | ND       |
| Aluminum                | ND                         | ND       | ND       | 2.21E-03           | 6.40E-02                     | ND                        | ND       | ND       |
| Barium                  | ND                         | ND       | ND       | 2.21E-03           | 2.00E-03                     | ND                        | ND       | ND       |
| Chromium                | ND                         | ND       | ND       | 2.21E-03           | 2.70E-02                     | ND                        | ND       | ND       |
| Copper                  | ND                         | ND       | ND       | 2.21E-03           | 4.70E-01                     | ND                        | ND       | ND       |
| Titanium                | ND                         | ND       | ND       | 2.21E-03           | 2.90E-02                     | ND                        | ND       | ND       |
| Zinc                    | ND                         | ND       | ND       | 2.21E-03           | 5.10E-02                     | ND                        | ND       | ND       |
| Fluoride                | ND                         | ND       | ND       | 2.21E-03           | 3.50E-02                     | ND                        | ND       | ND       |
| Total                   | ND                         | ND       | ND       |                    |                              | ND                        | ND       | ND       |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

TABLE A-5

**POLLUTANT REMOVALS**  
**RAIL CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical             | Pollutants Removed (grams) |          |          | Conversion Factors |                              |                           | Pound Equivalents Removed |          |          |
|----------------------|----------------------------|----------|----------|--------------------|------------------------------|---------------------------|---------------------------|----------|----------|
|                      | Option 1                   | Option 2 | Option 3 | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor | POTW<br>Removal<br>Factor | Option 1                  | Option 2 | Option 3 |
| Ethylbenzene         | 227                        | 227      | 29,971   | 2.21E-03           | 1.40E-03                     | 6.21E-02                  | 0.0                       | 0.0      | 0.0      |
| Methyl ethyl ketone  | 847                        | 847      | 97,956   | 2.21E-03           | 2.20E-05                     | 8.17E-02                  | 0.0                       | 0.0      | 0.0      |
| m-Xylene             | 512                        | 512      | 68,604   | 2.21E-03           | 1.50E-03                     | 3.46E-01                  | 0.0                       | 0.0      | 0.1      |
| o+p-Xylene           | 336                        | 336      | 44,656   | 2.21E-03           | 8.50E-03                     | 4.93E-02                  | 0.0                       | 0.0      | 0.0      |
| Anthracene           | 25,156                     | 25,156   | 25,156   | 2.21E-03           | 2.50E+00                     | 4.00E-02                  | 5.6                       | 5.6      | 5.6      |
| Benzoic acid         | 6,351                      | 6,351    | 860,040  | 2.21E-03           | 3.30E-04                     | 1.95E-01                  | 0.0                       | 0.0      | 0.1      |
| Carbazole            | 19,193                     | 19,193   | 19,193   | 2.21E-03           | 2.70E-01                     | 1.00E+00                  | 11.5                      | 11.5     | 11.5     |
| p-Cresol             | 107                        | 107      | 13,189   | 2.21E-03           | 2.40E-03                     | 2.83E-01                  | 0.0                       | 0.0      | 0.0      |
| 2,4-Diaminotoluene   | 3,935                      | 3,935    | 547,875  | 2.21E-03           | 1.80E-01                     | 1.00E+00                  | 1.6                       | 1.6      | 217.9    |
| n-Docosane           | 75,837                     | 75,837   | 75,837   | 2.21E-03           | 8.20E-05                     | 1.20E-01                  | 0.0                       | 0.0      | 0.0      |
| n-Dodecane           | 94,129                     | 99,963   | 99,963   | 2.21E-03           | 4.30E-03                     | 4.95E-02                  | 0.0                       | 0.0      | 0.0      |
| n-Eicosane           | 313,631                    | 317,494  | 317,494  | 2.21E-03           | 4.30E-03                     | 7.60E-02                  | 0.2                       | 0.2      | 0.2      |
| Fluoranthene         | 29,607                     | 29,607   | 29,607   | 2.21E-03           | 9.20E-01                     | 5.80E-01                  | 34.9                      | 34.9     | 34.9     |
| n-Hexacosane         | 39,782                     | 39,782   | 39,782   | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0                       | 0.0      | 0.0      |
| n-Hexadecane         | 637,418                    | 637,418  | 637,418  | 2.21E-03           | 4.30E-03                     | 2.89E-01                  | 1.7                       | 1.7      | 1.7      |
| 1-Methylphenanthrene | 25,016                     | 25,016   | 25,016   | 2.21E-03           | 1.40E-01                     | 5.00E-02                  | 0.4                       | 0.4      | 0.4      |
| Naphthalene          | 4,124                      | 14,342   | 14,342   | 2.21E-03           | 1.50E-02                     | 5.31E-02                  | 0.0                       | 0.0      | 0.0      |
| n-Octacosane         | 22,610                     | 22,610   | 22,610   | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0                       | 0.0      | 0.0      |
| n-Octadecane         | 374,351                    | 377,403  | 377,403  | 2.21E-03           | 4.30E-03                     | 2.89E-01                  | 1.0                       | 1.0      | 1.0      |
| Phenanthrene         | 63,656                     | 63,656   | 63,656   | 2.21E-03           | 1.90E+01                     | 5.11E-02                  | 136.6                     | 136.6    | 136.6    |
| Phenol               | 1,101                      | 1,101    | 154,730  | 2.21E-03           | 2.80E-02                     | 4.75E-02                  | 0.0                       | 0.0      | 0.5      |
| Pyrene               | 22,698                     | 22,698   | 22,698   | 2.21E-03           | 7.50E-02                     | 5.00E-02                  | 0.2                       | 0.2      | 0.2      |
| Styrene              | 47,209                     | 47,209   | 47,209   | 2.21E-03           | 1.40E-02                     | 6.35E-02                  | 0.1                       | 0.1      | 0.1      |
| n-Tetracosane        | 64,766                     | 64,766   | 64,766   | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0                       | 0.0      | 0.0      |
| n-Tetradecane        | 429,663                    | 432,950  | 432,950  | 2.21E-03           | 4.30E-03                     | 2.89E-01                  | 1.2                       | 1.2      | 1.2      |
| n-Triacontane        | 23,826                     | 23,826   | 23,826   | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0                       | 0.0      | 0.0      |
| Dioxathion           | 970                        | 970      | 970      | 2.21E-03           | 6.22E+01                     | 1.00E+00                  | 133.3                     | 133.3    | 133.3    |
| Tetrachlorvinphos    | 215                        | 215      | 215      | 2.21E-03           | 1.40E-01                     | 1.00E+00                  | 0.1                       | 0.1      | 0.1      |
| Tokuthion            | 438                        | 438      | 438      | 2.21E-03           | 9.30E-03                     | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Trichlorfon          | 1,053                      | 1,053    | 1,053    | 2.21E-03           | 7.00E+02                     | 1.00E+00                  | 1,629.1                   | 1,629.1  | 1,629.1  |
| Trichloronate        | 161                        | 161      | 161      | 2.21E-03           | 5.60E+03                     | 1.00E+00                  | 1,989.6                   | 1,989.6  | 1,989.6  |
| Trimethylphosphate   | 521                        | 521      | 521      | 2.21E-03           | 1.90E-03                     | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Acephate             | 14,330                     | 17,760   | 201,222  | 2.21E-03           | 1.30E-02                     | 1.00E+00                  | 0.4                       | 0.5      | 5.8      |
| Alachlor             | 35                         | 35       | 35       | 2.21E-03           | 1.60E-02                     | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Atrazine             | 206                        | 4,787    | 15,978   | 2.21E-03           | 9.40E-02                     | 5.80E-01                  | 0.0                       | 0.6      | 1.9      |
| Benefluralin         | 143                        | 292      | 411      | 2.21E-03           | 1.60E-01                     | 1.00E+00                  | 0.1                       | 0.1      | 0.1      |
| Alpha-BHC            | 7                          | 25       | 26       | 2.21E-03           | 4.30E+01                     | 3.60E-01                  | 0.2                       | 0.9      | 0.9      |
| Beta-BHC             | 7,982                      | 7,990    | 7,991    | 2.21E-03           | 1.20E+01                     | 5.70E-01                  | 120.7                     | 120.8    | 120.8    |
| Delta-BHC            | 91                         | 95       | 95       | 2.21E-03           | 2.80E-01                     | 1.00E+00                  | 0.1                       | 0.1      | 0.1      |
| Gamma-BHC            | 27                         | 31       | 83       | 2.21E-03           | 7.00E+01                     | 4.80E-01                  | 2.0                       | 2.3      | 6.1      |
| Bromacil             | 58                         | 144      | 144      | 2.21E-03           | 5.60E-03                     | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Bromoxynil octanoate | 30                         | 84       | 84       | 2.21E-03           | 1.10E+00                     | 1.00E+00                  | 0.1                       | 0.2      | 0.2      |
| Butachlor            | 51                         | 53       | 53       | 2.21E-03           | 7.40E-03                     | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Captafol             | 205                        | 205      | 205      | 2.21E-03           | 2.70E+00                     | 1.00E+00                  | 1.2                       | 1.2      | 1.2      |
| Captan               | 58                         | 143      | 171      | 2.21E-03           | 1.60E+00                     | 1.00E+00                  | 0.2                       | 0.5      | 0.6      |
| Carbofenthion        | 117                        | 117      | 117      | 2.21E-03           | 6.60E-01                     | 1.00E+00                  | 0.2                       | 0.2      | 0.2      |
| Alpha-Chlordane      | * 10                       | 10       | 10       | 2.21E-03           | 2.30E+03                     | 5.00E-01                  | 25.2                      | 25.2     | 25.2     |
| Gamma-Chlordane      | 5                          | 15       | 15       | 2.21E-03           | 2.30E+03                     | 5.00E-01                  | 11.8                      | 36.9     | 36.9     |
| Chlorobenzilate      | 64                         | 182      | 182      | 2.21E-03           | 1.60E-01                     | 1.00E+00                  | 0.0                       | 0.1      | 0.1      |
| Chloroneb            | 48                         | 1,093    | 6,796    | 2.21E-03           | 4.70E-03                     | 1.00E+00                  | 0.0                       | 0.0      | 0.1      |
| Dacthal (DCPA)       | 78                         | 83       | 83       | 2.21E-03           | 9.50E-03                     | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| 4,4'-DDD             | 35                         | 35       | 35       | 2.21E-03           | 7.60E+02                     | 1.00E+00                  | 58.1                      | 58.1     | 58.1     |
| 4,4'-DDE             | 0                          | 0        | 30       | 2.21E-03           | 9.50E+02                     | 1.00E+00                  | 0.7                       | 0.7      | 63.9     |
| 4,4'-DDT             | 28                         | 38       | 38       | 2.21E-03           | 6.50E+03                     | 4.00E-01                  | 163.4                     | 216.0    | 216.0    |
| Diallate             | 53,876                     | 59,594   | 59,594   | 2.21E-03           | 8.40E-03                     | 1.00E+00                  | 1.0                       | 1.1      | 1.1      |

TABLE A-5 (continued)

**POLLUTANT REMOVALS**  
**RAIL CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                | Pollutants Removed (grams) |            |            | Conversion Factors |                    |                           | Pound Equivalents Removed |          |          |
|-------------------------|----------------------------|------------|------------|--------------------|--------------------|---------------------------|---------------------------|----------|----------|
|                         | Option 1                   | Option 2   | Option 3   | Grams/<br>Pounds   | Toxic<br>Weighting | POTW<br>Removal<br>Factor | Option 1                  | Option 2 | Option 3 |
| Dichlone                | 2                          | 56         | 56         | 2.21E-03           | 4.00E+01           | 1.00E+00                  | 0.2                       | 5.0      | 5.0      |
| Dicofol                 | 77                         | 207        | 207        | 2.21E-03           | 5.70E+02           | 1.00E+00                  | 97.3                      | 260.6    | 260.6    |
| Dieldrin                | 323                        | 355        | 368        | 2.21E-03           | 5.70E+04           | 1.40E-01                  | 5,696.9                   | 6,255.2  | 6,487.7  |
| Endosulfan I            | 6                          | 14         | 18         | 2.21E-03           | 1.00E+02           | 5.00E-01                  | 0.6                       | 1.5      | 2.0      |
| Endosulfan Sulfate      | 34                         | 42         | 42         | 2.21E-03           | 1.00E+02           | 4.20E-01                  | 3.2                       | 3.9      | 3.9      |
| Endrin                  | 12                         | 30         | 38         | 2.21E-03           | 9.80E+01           | 5.00E-01                  | 1.3                       | 3.2      | 4.1      |
| Endrin aldehyde         | 74                         | 80         | 109        | 2.21E-03           | 9.80E+01           | 1.00E+00                  | 16.0                      | 17.3     | 23.6     |
| Endrin ketone           | 7                          | 18         | 18         | 2.21E-03           | 9.80E-01           | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Ethalfuralin            | 169                        | 455        | 1,312      | 2.21E-03           | 7.50E+00           | 1.00E+00                  | 2.8                       | 7.5      | 21.8     |
| Etradiazole             | 0                          | 0          | 31         | 2.21E-03           | 4.60E-03           | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Fenarimol               | 18                         | 56         | 56         | 2.21E-03           | 6.20E-02           | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Heptachlor epoxide      | 7                          | 22         | 22         | 2.21E-03           | 6.80E+03           | 1.00E+00                  | 111.7                     | 335.3    | 335.3    |
| Isodrin                 | 28                         | 28         | 28         | 2.21E-03           | 1.40E+01           | 1.00E+00                  | 0.9                       | 0.9      | 0.9      |
| Isopropalin             | 29                         | 80         | 108        | 2.21E-03           | 5.80E-01           | 1.00E+00                  | 0.0                       | 0.1      | 0.1      |
| Methoxychlor            | 1                          | 1          | 63         | 2.21E-03           | 1.90E+02           | 4.20E-01                  | 0.1                       | 0.1      | 11.2     |
| Metribuzin              | 22                         | 22         | 22         | 2.21E-03           | 1.30E-03           | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Mirex                   | 2                          | 36         | 36         | 2.21E-03           | 5.60E+03           | 1.00E+00                  | 20.3                      | 443.9    | 443.9    |
| Nitrofen                | 143                        | 170        | 176        | 2.21E-03           | 4.80E-02           | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Pendamethalin           | 36                         | 104        | 107        | 2.21E-03           | 1.50E-01           | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Pentachloronitrobenzene | 18                         | 71         | 81         | 2.21E-03           | 2.70E-01           | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| CIS-Permethrin          | 221                        | 718        | 718        | 2.21E-03           | 3.40E+00           | 1.00E+00                  | 1.7                       | 5.4      | 5.4      |
| Perthane                | 10,539                     | 10,539     | 10,607     | 2.21E-03           | 1.40E+01           | 1.00E+00                  | 326.1                     | 326.1    | 328.2    |
| Propachlor              | 3,672                      | 3,672      | 3,672      | 2.21E-03           | 3.30E-01           | 1.00E+00                  | 2.7                       | 2.7      | 2.7      |
| Propazine               | 3,123                      | 3,123      | 3,123      | 2.21E-03           | 4.70E-03           | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Simazine                | 5,527,713                  | 5,731,258  | 6,675,665  | 2.21E-03           | 5.60E-01           | 1.00E+00                  | 6,841.1                   | 7,093.0  | 8,261.8  |
| Stobane                 | 13,571                     | 13,571     | 13,571     | 2.21E-03           | 1.10E+02           | 1.00E+00                  | 3,299.0                   | 3,299.0  | 3,299.0  |
| Terbacil                | 5,665                      | 5,665      | 5,665      | 2.21E-03           | 8.00E-01           | 1.00E+00                  | 10.0                      | 10.0     | 10.0     |
| Terbutylazine           | 5,030                      | 119,083    | 727,211    | 2.21E-03           | 1.20E-02           | 1.00E+00                  | 0.1                       | 3.2      | 19.3     |
| Triadimenon             | 89                         | 101        | 101        | 2.21E-03           | 5.80E-03           | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| Trifluralin             | 81                         | 207        | 253        | 2.21E-03           | 4.20E+00           | 2.90E-01                  | 0.2                       | 0.6      | 0.7      |
| 2,4-D                   | 10,203                     | 11,686     | 11,686     | 2.21E-03           | 3.10E-03           | 5.10E-01                  | 0.0                       | 0.0      | 0.0      |
| Dalapon                 | 3,082                      | 3,082      | 3,082      | 2.21E-03           | 5.10E-03           | 1.00E+00                  | 0.0                       | 0.0      | 0.0      |
| 2,4-DB (Butoxon)        | 4,320                      | 17,029     | 21,095     | 2.21E-03           | 3.60E-02           | 1.00E+00                  | 0.3                       | 1.4      | 1.7      |
| Dicamba                 | 4,533                      | 66,905     | 67,021     | 2.21E-03           | 1.50E-02           | 1.00E+00                  | 0.2                       | 2.2      | 2.2      |
| Dichloroprop            | 10,518                     | 11,499     | 13,678     | 2.21E-03           | 9.30E-02           | 1.00E+00                  | 2.2                       | 2.4      | 2.8      |
| Dinoseb                 | 3,885                      | 4,630      | 4,630      | 2.21E-03           | 1.90E+00           | 1.00E+00                  | 16.3                      | 19.4     | 19.4     |
| MCPA                    | 58,670                     | 343,090    | 368,398    | 2.21E-03           | 1.60E-02           | 1.00E+00                  | 2.1                       | 12.1     | 13.0     |
| CPP                     | 645,846                    | 4,634,697  | 5,186,698  | 2.21E-03           | 6.90E-03           | 1.00E+00                  | 9.8                       | 70.7     | 79.1     |
| Picloram                | 44                         | 44         | 6,233      | 2.21E-03           | 2.10E+00           | 1.00E+00                  | 0.2                       | 0.2      | 28.9     |
| 2,4,5-T                 | 1,602                      | 1,884      | 2,027      | 2.21E-03           | 2.80E-01           | 4.40E-01                  | 0.4                       | 0.5      | 0.6      |
| 2,4,5-TP                | 187                        | 1,579      | 1,579      | 2.21E-03           | 1.80E-01           | 5.60E-01                  | 0.0                       | 0.4      | 0.4      |
| Aluminum                | 1,659,717                  | 1,659,717  | 3,789,760  | 2.21E-03           | 6.40E-02           | 1.20E-01                  | 28.2                      | 28.2     | 64.3     |
| Barium                  | 23,466                     | 121,891    | 121,891    | 2.21E-03           | 2.00E-03           | 6.40E-01                  | 0.1                       | 0.3      | 0.3      |
| Chromium                | 5,044                      | 22,303     | 22,303     | 2.21E-03           | 2.70E-02           | 3.30E-01                  | 0.1                       | 0.4      | 0.4      |
| Copper                  | 2,469                      | 17,684     | 17,684     | 2.21E-03           | 4.70E-01           | 1.59E-01                  | 0.4                       | 2.9      | 2.9      |
| Titanium                | 1,726                      | 17,095     | 17,095     | 2.21E-03           | 2.90E-02           | 3.12E-01                  | 0.0                       | 0.3      | 0.3      |
| Zinc                    | 7,616                      | 76,451     | 76,451     | 2.21E-03           | 5.10E-02           | 2.20E-01                  | 0.2                       | 1.9      | 1.9      |
| Fluoride                | 6,154                      | 6,154      | 687,802    | 2.21E-03           | 3.50E-02           | 3.90E-01                  | 0.2                       | 0.2      | 20.7     |
| Total                   | 10,426,724                 | 15,355,713 | 22,315,298 |                    |                    |                           | 20,825.6                  | 22,630.8 | 24,470.0 |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

**TABLE A-6**  
**POLLUTANT REMOVALS**  
**BARGE CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical                     | Pollutants Removed (grams) |            | Conversion Factors |                               | Pound Equivalents Removed |          |
|------------------------------|----------------------------|------------|--------------------|-------------------------------|---------------------------|----------|
|                              | Option 1                   | Option 2   | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factors | Option 1                  | Option 2 |
| Acetone                      | 2,434,613                  | 3,432,577  | 2.21E-03           | 7.6E-06                       | 0.0                       | 0.1      |
| Acrylonitrile                | 2,265,455                  | 2,265,455  | 2.21E-03           | 8.5E-01                       | 4,255.7                   | 4,255.7  |
| Benzene                      | 255,727                    | 299,036    | 2.21E-03           | 1.8E-02                       | 10.2                      | 11.9     |
| Chloroform                   | 4,958                      | 4,958      | 2.21E-03           | 2.1E-03                       | 0.0                       | 0.0      |
| Ethylbenzene                 | 174,257                    | 238,038    | 2.21E-03           | 1.4E-03                       | 0.5                       | 0.7      |
| Methyl ethyl ketone          | 2,625,822                  | 2,689,349  | 2.21E-03           | 2.2E-05                       | 0.1                       | 0.1      |
| Methyl isobutyl ketone       | 1,034,816                  | 1,034,816  | 2.21E-03           | 1.2E-04                       | 0.3                       | 0.3      |
| Methylene chloride           | 2,042                      | 2,042      | 2.21E-03           | 4.2E-04                       | 0.0                       | 0.0      |
| Toluene                      | 375,373                    | 447,222    | 2.21E-03           | 5.6E-03                       | 4.6                       | 5.5      |
| m-Xylene                     | 136,744                    | 220,292    | 2.21E-03           | 1.5E-03                       | 0.5                       | 0.7      |
| o+p-Xylene                   | 115,739                    | 230,304    | 2.21E-03           | 8.5E-03                       | 2.2                       | 4.3      |
| Acenaphthene                 | 61,498                     | 61,498     | 2.21E-03           | 2.5E-01                       | 34.0                      | 34.0     |
| Acenaphthylene               | 50,807                     | 50,807     | 2.21E-03           | 8.4E-03                       | 0.9                       | 0.9      |
| Anthracene                   | 41,233                     | 41,233     | 2.21E-03           | 2.5E+00                       | 227.8                     | 227.8    |
| 2,3-Benzofluorene            | 17,813                     | 17,813     | 2.21E-03           | 2.2E-01                       | 8.7                       | 8.7      |
| Benzoic acid                 | 37,339                     | 37,339     | 2.21E-03           | 3.3E-04                       | 0.0                       | 0.0      |
| Biphenyl                     | 230,862                    | 230,862    | 2.21E-03           | 3.7E-02                       | 18.9                      | 18.9     |
| bis (2-Ethylhexyl) phthalate | 84,472                     | 84,472     | 2.21E-03           | 1.1E-01                       | 20.5                      | 20.5     |
| p-Cymene                     | 57,377                     | 57,377     | 2.21E-03           | 4.3E-02                       | 5.5                       | 5.5      |
| n-Decane                     | 5,804,201                  | 5,809,280  | 2.21E-03           | 4.3E-03                       | 55.2                      | 55.2     |
| 3,6-Dimethylphenanthrene     | 38,443                     | 38,443     | 2.21E-03           | 4.7E-01                       | 39.9                      | 39.9     |
| Di-n-octyl phthalate         | 55,164                     | 55,164     | 2.21E-03           | 2.2E-01                       | 26.8                      | 26.8     |
| n-Docosane                   | 291,322                    | 291,322    | 2.21E-03           | 8.2E-05                       | 0.1                       | 0.1      |
| n-Dodecane                   | 3,111,416                  | 3,129,225  | 2.21E-03           | 4.3E-03                       | 29.6                      | 29.7     |
| n-Eicosane                   | 898,961                    | 898,961    | 2.21E-03           | 4.3E-03                       | 8.5                       | 8.5      |
| Fluorene                     | 94,496                     | 94,496     | 2.21E-03           | 7.0E-01                       | 146.2                     | 146.2    |
| n-Hexacosane                 | 33,127                     | 33,127     | 2.21E-03           | 8.2E-05                       | 0.0                       | 0.0      |
| n-Hexadecane                 | 3,405,439                  | 3,410,129  | 2.21E-03           | 4.3E-03                       | 32.4                      | 32.4     |
| 1-Methylfluorene             | 82,616                     | 82,616     | 2.21E-03           | 8.9E-02                       | 16.2                      | 16.2     |
| 2-Methylnaphthalene          | 616,462                    | 632,606    | 2.21E-03           | 1.8E-02                       | 24.5                      | 25.2     |
| 1-Methylphenanthrene         | 189,808                    | 189,808    | 2.21E-03           | 1.4E-01                       | 58.7                      | 58.7     |
| Naphthalene                  | 6,327,446                  | 6,352,165  | 2.21E-03           | 1.5E-02                       | 209.8                     | 210.6    |
| n-Octacosane                 | 14,583                     | 14,583     | 2.21E-03           | 8.2E-05                       | 0.0                       | 0.0      |
| n-Octadecane                 | 1,741,022                  | 1,741,022  | 2.21E-03           | 4.3E-03                       | 16.5                      | 16.5     |
| Pentamethylbenzene           | 276,205                    | 276,205    | 2.21E-03           | 2.9E-01                       | 177.0                     | 177.0    |
| Phenanthere                  | 144,952                    | 144,952    | 2.21E-03           | 1.9E+01                       | 6,086.5                   | 6,086.5  |
| Phenol                       | 15,630                     | 15,630     | 2.21E-03           | 2.8E-02                       | 1.0                       | 1.0      |
| Pyrene                       | 78,242                     | 78,242     | 2.21E-03           | 7.5E-02                       | 13.0                      | 13.0     |
| Styrene                      | 15,392,801                 | 15,450,225 | 2.21E-03           | 1.4E-02                       | 476.3                     | 478.0    |
| n-Tetracosane                | 176,309                    | 176,309    | 2.21E-03           | 8.2E-05                       | 0.0                       | 0.0      |
| n-Tetradecane                | 5,988,921                  | 5,995,600  | 2.21E-03           | 4.3E-03                       | 56.9                      | 57.0     |
| Dalapon                      | 680                        | 680        | 2.21E-03           | 5.1E-03                       | 0.0                       | 0.0      |
| Aluminum                     | 1,739,789                  | 2,068,475  | 2.21E-03           | 6.4E-02                       | 246.1                     | 292.6    |
| Beryllium                    | 91                         | 91         | 2.21E-03           | 5.3E+00                       | 1.1                       | 1.1      |
| Cadmium                      | 5,352                      | 5,352      | 2.21E-03           | 5.2E+00                       | 61.5                      | 61.5     |
| Chromium                     | 27,025                     | 27,025     | 2.21E-03           | 2.7E-02                       | 1.6                       | 1.6      |
| Copper                       | 141,243                    | 141,243    | 2.21E-03           | 4.7E-01                       | 146.7                     | 146.7    |
| Hexavalent Chromium          | 6,228                      | 6,228      | 2.21E-03           | 5.1E-01                       | 7.0                       | 7.0      |
| Iron                         | 40,055,479                 | 41,182,205 | 2.21E-03           | 5.6E-03                       | 495.7                     | 509.7    |
| Lead                         | 47,952                     | 47,952     | 2.21E-03           | 1.8E+00                       | 190.8                     | 190.8    |
| Manganese                    | 201,760                    | 331,409    | 2.21E-03           | 1.4E-02                       | 6.2                       | 10.3     |
| Mercury                      | 383                        | 383        | 2.21E-03           | 5.0E+02                       | 423.7                     | 423.7    |

TABLE A-6 (continued)

**POLLUTANT REMOVALS**  
**BARGE CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical   | Pollutants Removed (grams) |             | Conversion Factors |                               | Pound Equivalents Removed |          |
|------------|----------------------------|-------------|--------------------|-------------------------------|---------------------------|----------|
|            | Option 1                   | Option 2    | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factors | Option 1                  | Option 2 |
| Molybdenum | 120                        | 59,013      | 2.21E-03           | 2.0E-01                       | 0.1                       | 26.1     |
| Nickel     | 116,673                    | 172,872     | 2.21E-03           | 3.6E-02                       | 9.3                       | 13.8     |
| Tantalum   | 23,762                     | 23,762      | 2.21E-03           | 6.0E-02                       | 3.2                       | 3.2      |
| Titanium   | 3,124                      | 3,124       | 2.21E-03           | 2.9E-02                       | 0.2                       | 0.2      |
| Zinc       | 1,749,307                  | 2,306,634   | 2.21E-03           | 5.1E-02                       | 197.2                     | 260.0    |
| Zirconium  | 211                        | 211         | 2.21E-03           | 5.4E-01                       | 0.3                       | 0.3      |
| Fluoride   | 947                        | 947         | 2.21E-03           | 3.5E-02                       | 0.1                       | 0.1      |
| Total      | 98,904,640                 | 102,733,203 |                    |                               | 13,856.1                  | 14,022.7 |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

TABLE A-7

**POLLUTANT REMOVALS**  
**BARGE CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                     | Pollutants Removed (grams) |          |          | Conversion Factors |                               | Pound Equivalents Removed |          |          |          |
|------------------------------|----------------------------|----------|----------|--------------------|-------------------------------|---------------------------|----------|----------|----------|
|                              | Option 1                   | Option 2 | Option 3 | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factors | POTW<br>Removal<br>Factor | Option 1 | Option 2 | Option 3 |
| Acetone                      | ND                         | ND       | ND       | 2.21E-03           | 7.60E-06                      | 1.63E-01                  | ND       | ND       | ND       |
| Acrylonitrile                | ND                         | ND       | ND       | 2.21E-03           | 8.50E-01                      | 5.00E-02                  | ND       | ND       | ND       |
| Benzene                      | ND                         | ND       | ND       | 2.21E-03           | 1.80E-02                      | 5.24E-02                  | ND       | ND       | ND       |
| Chloroform                   | ND                         | ND       | ND       | 2.21E-03           | 2.10E-03                      | 2.66E-01                  | ND       | ND       | ND       |
| Ethylbenzene                 | ND                         | ND       | ND       | 2.21E-03           | 1.40E-03                      | 6.21E-02                  | ND       | ND       | ND       |
| Methyl ethyl ketone          | ND                         | ND       | ND       | 2.21E-03           | 2.20E-05                      | 8.17E-02                  | ND       | ND       | ND       |
| Methyl isobutyl ketone       | ND                         | ND       | ND       | 2.21E-03           | 1.20E-04                      | 1.21E-01                  | ND       | ND       | ND       |
| Methylene chloride           | ND                         | ND       | ND       | 2.21E-03           | 4.20E-04                      | 4.57E-01                  | ND       | ND       | ND       |
| Toluene                      | ND                         | ND       | ND       | 2.21E-03           | 5.60E-03                      | 3.82E-02                  | ND       | ND       | ND       |
| m-Xylene                     | ND                         | ND       | ND       | 2.21E-03           | 1.50E-03                      | 3.46E-01                  | ND       | ND       | ND       |
| o,p-Xylene                   | ND                         | ND       | ND       | 2.21E-03           | 8.50E-03                      | 4.93E-02                  | ND       | ND       | ND       |
| Acenaphthene                 | ND                         | ND       | ND       | 2.21E-03           | 2.50E-01                      | 2.00E-02                  | ND       | ND       | ND       |
| Acenaphthylene               | ND                         | ND       | ND       | 2.21E-03           | 8.40E-03                      | 5.00E-02                  | ND       | ND       | ND       |
| Anthracene                   | ND                         | ND       | ND       | 2.21E-03           | 2.50E+00                      | 4.00E-02                  | ND       | ND       | ND       |
| 2,3-Benzofluorene            | ND                         | ND       | ND       | 2.21E-03           | 2.20E-01                      | 3.00E-01                  | ND       | ND       | ND       |
| Benzoic acid                 | ND                         | ND       | ND       | 2.21E-03           | 3.30E-04                      | 1.95E-01                  | ND       | ND       | ND       |
| Biphenyl                     | ND                         | ND       | ND       | 2.21E-03           | 3.70E-02                      | 4.00E-02                  | ND       | ND       | ND       |
| bis (2-Ethylhexyl) phthalate | ND                         | ND       | ND       | 2.21E-03           | 1.10E-01                      | 4.02E-01                  | ND       | ND       | ND       |
| p-Cymene                     | ND                         | ND       | ND       | 2.21E-03           | 4.30E-02                      | 1.00E-02                  | ND       | ND       | ND       |
| n-Decane                     | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                      | 9.10E-01                  | ND       | ND       | ND       |
| 3,6-Dimethylphenanthrene     | ND                         | ND       | ND       | 2.21E-03           | 4.70E-01                      | 5.00E-02                  | ND       | ND       | ND       |
| Di-n-octyl phthalate         | ND                         | ND       | ND       | 2.21E-03           | 2.20E-01                      | 1.70E-01                  | ND       | ND       | ND       |
| n-Docosane                   | ND                         | ND       | ND       | 2.21E-03           | 8.20E-05                      | 1.20E-01                  | ND       | ND       | ND       |
| n-Dodecane                   | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                      | 4.95E-02                  | ND       | ND       | ND       |
| n-Eicosane                   | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                      | 7.60E-02                  | ND       | ND       | ND       |
| Fluorene                     | ND                         | ND       | ND       | 2.21E-03           | 7.00E-01                      | 3.00E-01                  | ND       | ND       | ND       |
| n-Hexacosane                 | ND                         | ND       | ND       | 2.21E-03           | 8.20E-05                      | 2.89E-01                  | ND       | ND       | ND       |
| n-Hexadecane                 | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                      | 2.89E-01                  | ND       | ND       | ND       |
| 1-Methylfluorene             | ND                         | ND       | ND       | 2.21E-03           | 8.90E-02                      | 3.00E-01                  | ND       | ND       | ND       |
| 2-Methylnaphthalene          | ND                         | ND       | ND       | 2.21E-03           | 1.80E-02                      | 7.20E-01                  | ND       | ND       | ND       |
| 1-Methylphenanthrene         | ND                         | ND       | ND       | 2.21E-03           | 1.40E-01                      | 5.00E-02                  | ND       | ND       | ND       |
| Naphthalene                  | ND                         | ND       | ND       | 2.21E-03           | 1.50E-02                      | 5.31E-02                  | ND       | ND       | ND       |
| n-Octacosane                 | ND                         | ND       | ND       | 2.21E-03           | 8.20E-05                      | 2.90E-01                  | ND       | ND       | ND       |
| n-Octadecane                 | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                      | 2.89E-01                  | ND       | ND       | ND       |
| Pentamethylbenzene           | ND                         | ND       | ND       | 2.21E-03           | 2.90E-01                      | 9.00E-02                  | ND       | ND       | ND       |
| Phenanthrene                 | ND                         | ND       | ND       | 2.21E-03           | 1.90E+01                      | 5.00E-02                  | ND       | ND       | ND       |
| Phenol                       | ND                         | ND       | ND       | 2.21E-03           | 2.80E-02                      | 5.00E-02                  | ND       | ND       | ND       |
| Pyrene                       | ND                         | ND       | ND       | 2.21E-03           | 7.50E-02                      | 5.00E-02                  | ND       | ND       | ND       |
| Styrene                      | ND                         | ND       | ND       | 2.21E-03           | 1.40E-02                      | 6.35E-02                  | ND       | ND       | ND       |
| n-Tetracosane                | ND                         | ND       | ND       | 2.21E-03           | 8.20E-05                      | 2.89E-01                  | ND       | ND       | ND       |
| n-Tetradecane                | ND                         | ND       | ND       | 2.21E-03           | 4.30E-03                      | 2.89E-01                  | ND       | ND       | ND       |
| Dalapon                      | ND                         | ND       | ND       | 2.21E-03           | 5.10E-03                      | 1.00E+00                  | ND       | ND       | ND       |
| Aluminum                     | ND                         | ND       | ND       | 2.21E-03           | 6.40E-02                      | 1.20E-01                  | ND       | ND       | ND       |
| Beryllium                    | ND                         | ND       | ND       | 2.21E-03           | 5.30E+00                      | 5.40E-01                  | ND       | ND       | ND       |
| Cadmium                      | ND                         | ND       | ND       | 2.21E-03           | 5.20E+00                      | 1.00E-01                  | ND       | ND       | ND       |
| Chromium                     | ND                         | ND       | ND       | 2.21E-03           | 2.70E-02                      | 3.30E-01                  | ND       | ND       | ND       |
| Copper                       | ND                         | ND       | ND       | 2.21E-03           | 4.70E-01                      | 1.60E-01                  | ND       | ND       | ND       |
| Hexavalent Chromium          | ND                         | ND       | ND       | 2.21E-03           | 5.10E-01                      | 9.40E-01                  | ND       | ND       | ND       |
| Iron                         | ND                         | ND       | ND       | 2.21E-03           | 5.60E-03                      | 1.70E-01                  | ND       | ND       | ND       |
| Lead                         | ND                         | ND       | ND       | 2.21E-03           | 1.80E+00                      | 8.00E-02                  | ND       | ND       | ND       |
| Manganese                    | ND                         | ND       | ND       | 2.21E-03           | 1.40E-02                      | 5.90E-01                  | ND       | ND       | ND       |
| Mercury                      | ND                         | ND       | ND       | 2.21E-03           | 5.00E+02                      | 4.00E-01                  | ND       | ND       | ND       |
| Molybdenum                   | ND                         | ND       | ND       | 2.21E-03           | 2.00E-01                      | 4.80E-01                  | ND       | ND       | ND       |
| Nickel                       | ND                         | ND       | ND       | 2.21E-03           | 3.60E-02                      | 4.90E-01                  | ND       | ND       | ND       |
| Tantalum                     | ND                         | ND       | ND       | 2.21E-03           | 6.00E-02                      | 4.50E-01                  | ND       | ND       | ND       |
| Titanium                     | ND                         | ND       | ND       | 2.21E-03           | 2.90E-02                      | 3.12E-01                  | ND       | ND       | ND       |
| Zinc                         | ND                         | ND       | ND       | 2.21E-03           | 5.10E-02                      | 2.20E-01                  | ND       | ND       | ND       |
| Zirconium                    | ND                         | ND       | ND       | 2.21E-03           | 5.40E-01                      | 1.00E+00                  | ND       | ND       | ND       |
| Total                        | ND                         | ND       | ND       |                    |                               |                           | ND       | ND       | ND       |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

**TABLE A-8**  
**POLLUTANT REMOVALS**  
**TRUCK PETROLEUM SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                        | Pollutants Removed (grams) | Conversion Factors |              |                         | Pound Equivalents Removed |
|---------------------------------|----------------------------|--------------------|--------------|-------------------------|---------------------------|
|                                 |                            | Option 1           | Grams/Pounds | Toxic Weighting Factors |                           |
| Acetone                         | 364,973                    | 2.21E-03           | 7.6E-06      | 1.6E-01                 | 0.0                       |
| Benzene                         | 13,733                     | 2.21E-03           | 1.8E-02      | 5.0E-02                 | 0.0                       |
| 1,2-Dichloroethane              | 701                        | 2.21E-03           | 6.2E-03      | 1.1E-01                 | 0.0                       |
| Ethylbenzene                    | 10,254                     | 2.21E-03           | 1.4E-03      | 6.0E-02                 | 0.0                       |
| Methyl ethyl ketone             | 32,958                     | 2.21E-03           | 2.2E-05      | 8.0E-02                 | 0.0                       |
| Methyl isobutyl ketone          | 3,493                      | 2.21E-03           | 1.2E-04      | 1.2E-01                 | 0.0                       |
| Methylene chloride              | 2,226                      | 2.21E-03           | 4.2E-04      | 4.6E-01                 | 0.0                       |
| Tetrachloroethylene             | 961                        | 2.21E-03           | 7.4E-02      | 1.5E-01                 | 0.0                       |
| Toluene                         | 54,707                     | 2.21E-03           | 5.6E-03      | 4.0E-02                 | 0.0                       |
| 1,1,1-Trichloroethane           | 3,274                      | 2.21E-03           | 4.3E-03      | 1.0E-01                 | 0.0                       |
| Trichloroethylene               | 702                        | 2.21E-03           | 6.3E-02      | 1.3E-01                 | 0.0                       |
| Vinyl Acetate                   | 3,766                      | 2.21E-03           | 4.0E-03      | 1.0E+00                 | 0.0                       |
| m-Xylene                        | 16,445                     | 2.21E-03           | 1.5E-03      | 3.5E-01                 | 0.0                       |
| o+p-Xylene                      | 8,016                      | 2.21E-03           | 8.5E-03      | 5.0E-02                 | 0.0                       |
| Benzoic acid                    | 17,370                     | 2.21E-03           | 3.3E-04      | 1.9E-01                 | 0.0                       |
| Biphenyl                        | 385                        | 2.21E-03           | 3.7E-02      | 4.0E-02                 | 0.0                       |
| bis (2-Ethylhexyl) phthalate    | 103                        | 2.21E-03           | 1.1E+01      | 4.0E-01                 | 1.0                       |
| 4-Chloro-3-Methylphenol         | 17,578                     | 2.21E-03           | 4.3E-03      | 2.9E-01                 | 0.0                       |
| n-Decane                        | 46,633                     | 2.21E-03           | 4.3E-03      | 9.1E-01                 | 0.4                       |
| Diphenyl Ether                  | 11                         | 2.21E-03           | 2.6E-02      | 3.0E-01                 | 0.0                       |
| n-Docosane                      | 3,185                      | 2.21E-03           | 8.2E-05      | 1.2E-01                 | 0.0                       |
| n-Dodecane                      | 34,547                     | 2.21E-03           | 4.3E-03      | 5.0E-02                 | 0.0                       |
| n-Eicosane                      | 16,550                     | 2.21E-03           | 4.3E-03      | 8.0E-02                 | 0.0                       |
| n-Hexacosane                    | 3,235                      | 2.21E-03           | 8.2E-05      | 2.9E-01                 | 0.0                       |
| n-Hexadecane                    | 21,426                     | 2.21E-03           | 4.3E-03      | 2.9E-01                 | 0.1                       |
| Hexanoic Acid                   | 6,022                      | 2.21E-03           | 3.4E-04      | 1.6E-01                 | 0.0                       |
| 2-Isopropynaphthalene           | 4,151                      | 2.21E-03           | 9.8E-02      | 7.2E-01                 | 0.6                       |
| 2-Methylnaphthalene             | 3,711                      | 2.21E-03           | 1.8E-02      | 7.2E-01                 | 0.1                       |
| Naphthalene                     | 3,513                      | 2.21E-03           | 1.5E-02      | 5.0E-02                 | 0.0                       |
| n-Octacosane                    | 2,259                      | 2.21E-03           | 8.2E-05      | 2.9E-01                 | 0.0                       |
| n-Octadecane                    | 7,248                      | 2.21E-03           | 4.3E-03      | 2.9E-01                 | 0.0                       |
| Pentamethylbenzene              | 3,909                      | 2.21E-03           | 2.9E-01      | 9.0E-02                 | 0.2                       |
| Phenol                          | 2,705                      | 2.21E-03           | 2.8E-02      | 5.0E-02                 | 0.0                       |
| n-Tetracosane                   | 3,445                      | 2.21E-03           | 8.2E-05      | 2.9E-01                 | 0.0                       |
| n-Tetradecane                   | 10,209                     | 2.21E-03           | 4.3E-03      | 2.9E-01                 | 0.0                       |
| n-Triaccontane                  | 87                         | 2.21E-03           | 8.2E-05      | 2.9E-01                 | 0.0                       |
| Tripropyleneglycol Methyl Ether | 113,949                    | 2.21E-03           | 8.2E-06      | 5.3E-01                 | 0.0                       |
| Aluminum                        | 13,642                     | 2.21E-03           | 6.4E-02      | 1.2E-01                 | 0.2                       |
| Antimony                        | 55                         | 2.21E-03           | 1.9E-01      | 4.4E-01                 | 0.0                       |
| Arsenic                         | 143                        | 2.21E-03           | 4.0E+00      | 1.0E+00                 | 1.3                       |
| Barium                          | 2,410                      | 2.21E-03           | 2.0E-03      | 6.4E-01                 | 0.0                       |
| Beryllium                       | 29                         | 2.21E-03           | 5.3E+00      | 5.4E-01                 | 0.2                       |
| Boron                           | 38,658                     | 2.21E-03           | 1.8E-01      | 7.7E-01                 | 11.8                      |
| Cadmium                         | 175                        | 2.21E-03           | 5.2E+00      | 1.0E-01                 | 0.2                       |
| Calcium                         | 107,780                    | 2.21E-03           | 2.8E-05      | 4.5E-01                 | 0.0                       |
| Chromium                        | 1,359                      | 2.21E-03           | 2.7E-02      | 3.3E-01                 | 0.0                       |

**TABLE A-8 (continued)**  
**POLLUTANT REMOVALS**  
**TRUCK PETROLEUM SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical            | Pollutants Removed (grams) | Conversion Factors |                            |                        | Pound Equivalents Removed<br>Option 1 |
|---------------------|----------------------------|--------------------|----------------------------|------------------------|---------------------------------------|
|                     |                            | Grams/<br>Pounds   | Toxic Weighting<br>Factors | POTW Removal<br>Factor |                                       |
|                     | Option 1                   |                    |                            |                        |                                       |
| Cobalt              | 546                        | 2.21E-03           | 1.1E-01                    | 6.3E-01                | 0.1                                   |
| Copper              | 11,839                     | 2.21E-03           | 4.7E-01                    | 1.6E-01                | 2.0                                   |
| Hexavalent Chromium | 1,900                      | 2.21E-03           | 5.1E-01                    | 9.4E-01                | 2.0                                   |
| Iron                | 160,398                    | 2.21E-03           | 5.6E-03                    | 1.7E-01                | 0.3                                   |
| Lead                | 8,332                      | 2.21E-03           | 1.8E+00                    | 8.0E-02                | 2.7                                   |
| Magnesium           | 39,177                     | 2.21E-03           | 8.7E-04                    | 7.4E-01                | 0.1                                   |
| Manganese           | 4,160                      | 2.21E-03           | 1.4E-02                    | 5.9E-01                | 0.1                                   |
| Mercury             | 2                          | 2.21E-03           | 5.0E+02                    | 4.0E-01                | 0.7                                   |
| Molybdenum          | 1,429                      | 2.21E-03           | 2.0E-01                    | 4.8E-01                | 0.3                                   |
| Nickel              | 42,143                     | 2.21E-03           | 3.6E-02                    | 4.9E-01                | 1.6                                   |
| Phosphorus          | 2,360                      | 2.21E-03           | 0.0E+00                    | 3.1E-01                | 0.0                                   |
| Potassium           | 4,901                      | 2.21E-03           | 1.1E-03                    | 8.0E-01                | 0.0                                   |
| Selenium            | 18                         | 2.21E-03           | 1.1E+00                    | 5.4E-01                | 0.0                                   |
| Silver              | 132                        | 2.21E-03           | 4.7E-01                    | 2.2E-01                | 0.0                                   |
| Sodium              | 1,864,821                  | 2.21E-03           | 5.5E-06                    | 4.5E-01                | 0.0                                   |
| Sulfur              | 6,314                      | 2.21E-03           | 5.6E-06                    | 8.8E-01                | 0.0                                   |
| Tantalum            | 67                         | 2.21E-03           | 6.0E-02                    | 4.5E-01                | 0.0                                   |
| Thallium            | 6                          | 2.21E-03           | 1.4E-01                    | 7.3E-01                | 0.0                                   |
| Tin                 | 685                        | 2.21E-03           | 3.0E-01                    | 3.5E-01                | 0.2                                   |
| Titanium            | 324                        | 2.21E-03           | 2.9E-02                    | 3.1E-01                | 0.0                                   |
| Tungsten            | 181                        | 2.21E-03           | 5.3E-03                    | 4.5E-01                | 0.0                                   |
| Vanadium            | 193                        | 2.21E-03           | 6.2E-01                    | 5.7E-01                | 0.2                                   |
| Zinc                | 11,674                     | 2.21E-03           | 5.1E-02                    | 2.2E-01                | 0.3                                   |
| Zirconium           | 11                         | 2.21E-03           | 5.4E-01                    | 1.0E+00                | 0.0                                   |
| Fluoride            | 38,859                     | 2.21E-03           | 3.5E-02                    | 3.9E-01                | 1.2                                   |
| Total Cyanide       | 48                         | 2.21E-03           | 1.1E+00                    | 3.0E-01                | 0.0                                   |
| <br>                | <br>                       | <br>               | <br>                       | <br>                   | <br>                                  |
| Total               | 3,203,208                  |                    |                            |                        | 28.2                                  |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

**TABLE A-9**  
**POLLUTANT REMOVALS**  
**RAIL PETROLEUM SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                         | Pollutants<br>Removed (grams) | Conversion Factors |                  |                              | Pound Equivalents<br>Removed |
|----------------------------------|-------------------------------|--------------------|------------------|------------------------------|------------------------------|
|                                  |                               | Option 1           | Grams/<br>Pounds | Toxic<br>Weighting<br>Factor |                              |
| Acetone                          | 1,337                         | 2.21E-03           | 7.6E-06          | 1.6E-01                      | 0.0                          |
| Benzene                          | 50                            | 2.21E-03           | 1.8E-02          | 5.0E-02                      | 0.0                          |
| 1,2-Dichloroethane               | 3                             | 2.21E-03           | 6.2E-03          | 1.1E-01                      | 0.0                          |
| Ethylbenzene                     | 38                            | 2.21E-03           | 1.4E-03          | 6.0E-02                      | 0.0                          |
| Methyl ethyl ketone              | 121                           | 2.21E-03           | 2.2E-05          | 8.0E-02                      | 0.0                          |
| Methyl isobutyl ketone           | 13                            | 2.21E-03           | 1.2E-04          | 1.2E-01                      | 0.0                          |
| Methylene chloride               | 8                             | 2.21E-03           | 4.2E-04          | 4.6E-01                      | 0.0                          |
| Tetrachloroethylene              | 4                             | 2.21E-03           | 7.4E-02          | 1.5E-01                      | 0.0                          |
| Toluene                          | 200                           | 2.21E-03           | 5.6E-03          | 4.0E-02                      | 0.0                          |
| 1,1,1-Trichloroethane            | 12                            | 2.21E-03           | 4.3E-03          | 1.0E-01                      | 0.0                          |
| Trichloroethylene                | 3                             | 2.21E-03           | 6.3E-02          | 1.3E-01                      | 0.0                          |
| Vinyl Acetate                    | 14                            | 2.21E-03           | 4.0E-03          | 1.0E+00                      | 0.0                          |
| m-Xylene                         | 60                            | 2.21E-03           | 1.5E-03          | 3.5E-01                      | 0.0                          |
| o+p-Xylene                       | 29                            | 2.21E-03           | 8.5E-03          | 5.0E-02                      | 0.0                          |
| Benzoic acid                     | 64                            | 2.21E-03           | 3.3E-04          | 1.9E-01                      | 0.0                          |
| Biphenyl                         | 1                             | 2.21E-03           | 3.7E-02          | 4.0E-02                      | 0.0                          |
| bis (2-Ethylhexyl) phthalate     | 0                             | 2.21E-03           | 1.1E+01          | 4.0E-01                      | 0.0                          |
| 4-Chloro-3-Methylphenol          | 64                            | 2.21E-03           | 4.3E-03          | 2.9E-01                      | 0.0                          |
| n-Decane                         | 171                           | 2.21E-03           | 4.3E-03          | 9.1E-01                      | 0.0                          |
| Diphenyl Ether                   | 0                             | 2.21E-03           | 2.6E-02          | 3.0E-01                      | 0.0                          |
| n-Docosane                       | 12                            | 2.21E-03           | 8.2E-05          | 1.2E-01                      | 0.0                          |
| n-Dodecane                       | 127                           | 2.21E-03           | 4.3E-03          | 5.0E-02                      | 0.0                          |
| n-Eicosane                       | 61                            | 2.21E-03           | 4.3E-03          | 8.0E-02                      | 0.0                          |
| n-Hexacosane                     | 12                            | 2.21E-03           | 8.2E-05          | 2.9E-01                      | 0.0                          |
| n-Hexadecane                     | 78                            | 2.21E-03           | 4.3E-03          | 2.9E-01                      | 0.0                          |
| Hexanoic Acid                    | 22                            | 2.21E-03           | 3.4E-04          | 1.6E-01                      | 0.0                          |
| 2-Isopropylnaphthalene           | 15                            | 2.21E-03           | 9.8E-02          | 7.2E-01                      | 0.0                          |
| 2-Methylnaphthalene              | 14                            | 2.21E-03           | 1.8E-02          | 7.2E-01                      | 0.0                          |
| Naphthalene                      | 13                            | 2.21E-03           | 1.5E-02          | 5.0E-02                      | 0.0                          |
| n-Octacosane                     | 8                             | 2.21E-03           | 8.2E-05          | 2.9E-01                      | 0.0                          |
| n-Octadecane                     | 27                            | 2.21E-03           | 4.3E-03          | 2.9E-01                      | 0.0                          |
| Pentamethylbenzene               | 14                            | 2.21E-03           | 2.9E-01          | 9.0E-02                      | 0.0                          |
| Phenol                           | 10                            | 2.21E-03           | 2.8E-02          | 5.0E-02                      | 0.0                          |
| n-Tetracosane                    | 13                            | 2.21E-03           | 8.2E-05          | 2.9E-01                      | 0.0                          |
| n-Tetradecane                    | 37                            | 2.21E-03           | 4.3E-03          | 2.9E-01                      | 0.0                          |
| n-Triacontane                    | 0                             | 2.21E-03           | 8.2E-05          | 2.9E-01                      | 0.0                          |
| Tripropylene glycol Methyl Ether | 417                           | 2.21E-03           | 8.2E-06          | 5.3E-01                      | 0.0                          |
| Aluminum                         | 50                            | 2.21E-03           | 6.4E-02          | 1.2E-01                      | 0.0                          |
| Antimony                         | 0                             | 2.21E-03           | 1.9E-01          | 4.4E-01                      | 0.0                          |
| Arsenic                          | 1                             | 2.21E-03           | 4.0E+00          | 1.0E+00                      | 0.0                          |
| Barium                           | 9                             | 2.21E-03           | 2.0E-03          | 6.4E-01                      | 0.0                          |
| Beryllium                        | 0                             | 2.21E-03           | 5.3E+00          | 5.4E-01                      | 0.0                          |
| Boron                            | 142                           | 2.21E-03           | 1.8E-01          | 7.7E-01                      | 0.0                          |
| Cadmium                          | 1                             | 2.21E-03           | 5.2E+00          | 1.0E-01                      | 0.0                          |
| Calcium                          | 395                           | 2.21E-03           | 2.8E-05          | 4.5E-01                      | 0.0                          |
| Chromium                         | 5                             | 2.21E-03           | 2.7E-02          | 3.3E-01                      | 0.0                          |

TABLE A-9 (continued)

**POLLUTANT REMOVALS**  
**RAIL PETROLEUM SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical            | Pollutants<br>Removed (grams)<br>Option 1 | Conversion Factors |                              |                           | Pound Equivalents<br>Removed<br>Option 1 |
|---------------------|---|--------------------|------------------------------|---------------------------|--|
|                     |   | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor | POTW<br>Removal<br>Factor |  |
| Cobalt              | 2   | 2.21E-03           | 1.1E-01                      | 6.3E-01                   | 0.0                                      |
| Copper              | 43  | 2.21E-03           | 4.7E-01                      | 1.6E-01                   | 0.0                                      |
| Hexavalent Chromium | 7   | 2.21E-03           | 5.1E-01                      | 9.4E-01                   | 0.0                                      |
| Iron                | 587                                       | 2.21E-03           | 5.6E-03                      | 1.7E-01                   | 0.0                                      |
| Lead                | 31  | 2.21E-03           | 1.8E+00                      | 8.0E-02                   | 0.0                                      |
| Magnesium           | 143                                       | 2.21E-03           | 8.7E-04                      | 7.4E-01                   | 0.0                                      |
| Manganese           | 15  | 2.21E-03           | 1.4E-02                      | 5.9E-01                   | 0.0                                      |
| Mercury             | 0   | 2.21E-03           | 5.0E+02                      | 4.0E-01                   | 0.0                                      |
| Molybdenum          | 5   | 2.21E-03           | 2.0E-01                      | 4.8E-01                   | 0.0                                      |
| Nickel              | 154                                       | 2.21E-03           | 3.6E-02                      | 4.9E-01                   | 0.0                                      |
| Phosphorus          | 9   | 2.21E-03           | 0.0E+00                      | 3.1E-01                   | 0.0                                      |
| Potassium           | 18  | 2.21E-03           | 1.1E-03                      | 8.0E-01                   | 0.0                                      |
| Selenium            | 0   | 2.21E-03           | 1.1E+00                      | 5.4E-01                   | 0.0                                      |
| Silver              | 0   | 2.21E-03           | 4.7E-01                      | 2.2E-01                   | 0.0                                      |
| Sodium              | 6,830                                     | 2.21E-03           | 5.5E-06                      | 4.5E-01                   | 0.0                                      |
| Sulfur              | 23  | 2.21E-03           | 5.6E-06                      | 8.8E-01                   | 0.0                                      |
| Tantalum            | 0   | 2.21E-03           | 6.0E-02                      | 4.5E-01                   | 0.0                                      |
| Thallium            | 0   | 2.21E-03           | 1.4E-01                      | 7.3E-01                   | 0.0                                      |
| Tin                 | 3   | 2.21E-03           | 3.0E-01                      | 3.5E-01                   | 0.0                                      |
| Titanium            | 1   | 2.21E-03           | 2.9E-02                      | 3.1E-01                   | 0.0                                      |
| Tungsten            | 1   | 2.21E-03           | 5.3E-03                      | 4.5E-01                   | 0.0                                      |
| Vanadium            | 1   | 2.21E-03           | 6.2E-01                      | 5.7E-01                   | 0.0                                      |
| Zinc                | 43  | 2.21E-03           | 5.1E-02                      | 2.2E-01                   | 0.0                                      |
| Zirconium           | 0   | 2.21E-03           | 5.4E-01                      | 1.0E+00                   | 0.0                                      |
| Fluoride            | 142                                       | 2.21E-03           | 3.5E-02                      | 3.9E-01                   | 0.0                                      |
| Total Cyanide       | 0   | 2.21E-03           | 1.1E+00                      | 3.0E-01                   | 0.0                                      |
| <br>                | <br>                                      | <br>               | <br>                         | <br>                      | <br>                                     |
| Total               | 11,732                                    |                    |                              |                           | 0.1                                      |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

**TABLE A-10**  
**POLLUTANT REMOVALS**  
**TRUCK FOOD SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical      | Conversion Factors         |                |                  |                              | Pound Equivalents Removed |                  |
|---------------|----------------------------|----------------|------------------|------------------------------|---------------------------|------------------|
|               | Pollutants Removed (grams) |                | Grams/<br>Pounds | Toxic<br>Weighting<br>Factor | POTW<br>Removal<br>Factor | Option 1         |
| Benzoic acid  | 23,557                     | 2,072,585,949  | 2.21E-03         | 3.30E-04                     | 1.90E-01                  | 0.0      287.2   |
| Hexanoic Acid | 532,692                    | 48,275,577,659 | 2.21E-03         | 3.40E-04                     | 1.60E-01                  | 0.1      5,803.9 |
| Phenol        | 2,491                      | 213,126,140    | 2.21E-03         | 2.80E-02                     | 5.00E-02                  | 0.0      659.4   |
| Total         | 558,740                    | 50,561,289,748 |                  |                              |                           | 0.1      6,750.5 |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

**TABLE A-11**  
**POLLUTANT REMOVALS**  
**RAIL FOOD SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical      | Pollutants Removed (grams) |          | Conversion Factors |                              |                           | Pound Equivalents Removed |          |
|---------------|----------------------------|----------|--------------------|------------------------------|---------------------------|---------------------------|----------|
|               | Option 1                   | Option 2 | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor | POTW<br>Removal<br>Factor | Option 1                  | Option 2 |
| Benzoic acid  | ND                         | ND       | 2.21E-03           | 3.30E-04                     | 1.90E-01                  | ND                        | ND       |
| Hexanoic Acid | ND                         | ND       | 2.21E-03           | 3.40E-04                     | 1.60E-01                  | ND                        | ND       |
| Phenol        | ND                         | ND       | 2.21E-03           | 2.80E-02                     | 5.00E-02                  | ND                        | ND       |
| Total         | ND                         | ND       |                    |                              |                           | ND                        | ND       |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

**TABLE A-12**  
**POLLUTANT REMOVALS**  
**BARGE FOOD SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical      | Conversion Factors         |          |                  |                              | Pound Equivalents Removed |          |
|---------------|----------------------------|----------|------------------|------------------------------|---------------------------|----------|
|               | Pollutants Removed (grams) |          | Grams/<br>Pounds | Toxic<br>Weighting<br>Factor | POTW<br>Removal<br>Factor | Option 1 |
|               | Option 1                   | Option 2 |                  |                              |                           | Option 2 |
| Benzoic acid  | ND                         | ND       | 2.21E-03         | 3.30E-04                     | 1.90E-01                  | ND       |
| Hexanoic Acid | ND                         | ND       | 2.21E-03         | 3.40E-04                     | 1.60E-01                  | ND       |
| Phenol        | ND                         | ND       | 2.21E-03         | 2.80E-02                     | 5.00E-02                  | ND       |
| Total         | ND                         | ND       |                  |                              |                           | ND       |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

**TABLE A-13**  
**POLLUTANT REMOVALS**  
**TRUCK HOPPER SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical  | Pollutants<br>Removed<br>(grams) | Conversion Factors |                              |                           | Pound<br>Equivalents<br>Removed |
|-----------|----------------------------------|--------------------|------------------------------|---------------------------|---------------------------------|
|           | Option 1                         | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor | POTW<br>Removal<br>Factor | Option 1                        |
| Aluminum  | 39,775                           | 2.21E-03           | 6.40E-02                     | 1.20E-01                  | 0.7                             |
| Beryllium | 18                               | 2.21E-03           | 5.30E+00                     | 5.40E-01                  | 0.1                             |
| Calcium   | 599,274                          | 2.21E-03           | 2.80E-05                     | 4.50E-01                  | 0.0                             |
| Chromium  | 49                               | 2.21E-03           | 2.70E-02                     | 3.30E-01                  | 0.0                             |
| Iron      | 236,812                          | 2.21E-03           | 5.60E-03                     | 1.70E-01                  | 0.5                             |
| Manganese | 7,125                            | 2.21E-03           | 1.40E-02                     | 5.90E-01                  | 0.1                             |
| Titanium  | 1,512                            | 2.21E-03           | 2.90E-02                     | 3.10E-01                  | 0.0                             |
| Zinc      | 559                              | 2.21E-03           | 5.10E-02                     | 2.20E-01                  | 0.0                             |
| Total     | 885,123                          |                    |                              |                           | 1.5                             |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

**TABLE A-14**

**POLLUTANT REMOVALS  
RAIL HOPPER SUBCATEGORY  
INDIRECT DISCHARGERS**

| Chemical  | Pollutants Removed<br>(grams) | Conversion Factors |                  |                        | Pound Equivalents Removed |
|-----------|-------------------------------|--------------------|------------------|------------------------|---------------------------|
|           |                               | Option 1           | Grams/<br>Pounds | Toxic Weighting Factor |                           |
| Aluminum  | ND                            | 2.21E-03           | 6.40E-02         | 1.20E-01               | ND                        |
| Beryllium | ND                            | 2.21E-03           | 5.30E+00         | 5.40E-01               | ND                        |
| Calcium   | ND                            | 2.21E-03           | 2.80E-05         | 4.50E-01               | ND                        |
| Chromium  | ND                            | 2.21E-03           | 2.70E-02         | 3.30E-01               | ND                        |
| Iron      | ND                            | 2.21E-03           | 5.60E-03         | 1.70E-01               | ND                        |
| Manganese | ND                            | 2.21E-03           | 1.40E-02         | 5.90E-01               | ND                        |
| Titanium  | ND                            | 2.21E-03           | 2.90E-02         | 3.10E-01               | ND                        |
| Zinc      | ND                            | 2.21E-03           | 5.10E-02         | 2.20E-01               | ND                        |
| Total     | ND                            |                    |                  |                        | ND                        |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

ND: Not disclosed due to business confidentiality.

**TABLE A-15**  
**POLLUTANT REMOVALS**  
**BARGE HOPPER SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical  | Pollutants Removed<br>(grams) | Conversion Factors |                  | Pound Equivalents Removed |
|-----------|-------------------------------|--------------------|------------------|---------------------------|
|           |                               | Option 1           | Grams/<br>Pounds |                           |
| Aluminum  | 50,865                        | 2.21E-03           | 6.40E-02         | 7.2                       |
| Beryllium | 22                            | 2.21E-03           | 5.30E+00         | 0.3                       |
| Calcium   | 773,702                       | 2.21E-03           | 2.80E-05         | 0.0                       |
| Chromium  | 79                            | 2.21E-03           | 2.70E-02         | 0.0                       |
| Iron      | 302,141                       | 2.21E-03           | 5.60E-03         | 3.7                       |
| Manganese | 9,125                         | 2.21E-03           | 1.40E-02         | 0.3                       |
| Titanium  | 1,913                         | 2.21E-03           | 2.90E-02         | 0.1                       |
| Zinc      | 720                           | 2.21E-03           | 5.10E-02         | 0.1                       |
| Total     | 1,138,567                     |                    |                  | 11.7                      |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

**TABLE A-16**  
**POLLUTANT REMOVALS**  
**BARGE HOPPER SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical  | Pollutants Removed<br>(grams)<br>Option 1 | Conversion Factors |                        |                     | Pound Equivalents Removed<br>Option 1 |
|-----------|---|--------------------|------------------------|---------------------|---------------------------------------|
|           |   | Grams/<br>Pounds   | Toxic Weighting Factor | POTW Removal Factor |                                       |
| Aluminum  | 3,950                                     | 2.21E-03           | 6.40E-02               | 1.20E-01            | 0.1                                   |
| Beryllium | 1   | 2.21E-03           | 5.30E+00               | 5.40E-01            | 0.0                                   |
| Calcium   | 86,820                                    | 2.21E-03           | 2.80E-05               | 4.50E-01            | 0.0                                   |
| Chromium  | 25  | 2.21E-03           | 2.70E-02               | 3.30E-01            | 0.0                                   |
| Iron      | 20,903                                    | 2.21E-03           | 5.60E-03               | 1.70E-01            | 0.0                                   |
| Manganese | 759                                       | 2.21E-03           | 1.40E-02               | 5.90E-01            | 0.0                                   |
| Titanium  | 76  | 2.21E-03           | 2.90E-02               | 3.10E-01            | 0.0                                   |
| Zinc      | 76  | 2.21E-03           | 5.10E-02               | 2.20E-01            | 0.0                                   |
| Total     | 112,609                                   |                    |                        |                     | 0.1                                   |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.



## **APPENDIX B**

### **SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS ANALYSIS: BASELINE POLLUTANT DISCHARGES IN POUNDS AND POUND EQUIVALENTS**



TABLE B-1

PRIORITY NONCONVENTIONAL POLLUTANTS DISCHARGED AT BASELINE  
INDUSTRY TOTALS

| Subcategory      | Pounds  |             |             | Pound Equivalents (PEs) |           |           |
|------------------|---------|-------------|-------------|-------------------------|-----------|-----------|
|                  | Direct  | Indirect    | Total       | Direct                  | Indirect  | Total     |
| Truck Chemical * | 1,896   | 893,493     | 895,388     | 5,959.1                 | 352,309.7 | 358,268.8 |
| Rail Chemical *  | 360     | 50,418      | 50,779      | 657.9                   | 35,513.1  | 36,171.0  |
| Barge Chemical   | 229,006 | 18,912      | 247,918     | 14,534.1                | 130.4     | 14,664.5  |
| Truck Petroleum  | NA      | 7,079       | 7,079       | NA                      | 28.2      | 28.2      |
| Rail Petroleum   | NA      | 26          | 26          | NA                      | 0.1       | 0.1       |
| Truck Food       | NA      | 111,736,628 | 111,736,628 | NA                      | 6,750.3   | 6,750.3   |
| Rail Food        | NA      | 32,054,643  | 32,054,643  | NA                      | 1,936.5   | 1,936.5   |
| Barge Food       | NA      | 212,258     | 212,258     | NA                      | 12.8      | 12.8      |
| Truck Hopper     | NA      | 4,127       | 4,127       | NA                      | 2.7       | 2.7       |
| Rail Hopper      | NA      | 43          | 43          | NA                      | 0.0       | 0.0       |
| Barge Hopper     | 5,234   | 1,449       | 6,683       | 21.2                    | 0.8       | 22.0      |
| Industry Total   | 236,497 | 144,979,077 | 145,215,574 | 21,172.3                | 396,684.7 | 417,857.0 |

\* Pollutants directly discharged are unweighted because direct dischargers were identified only in the screener questionnaire.  
NA: Not applicable.

**TABLE B-2**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**TRUCK CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical                     | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        | Pound Equivalents Discharged at Baseline |
|------------------------------|---|--------------------|------------------------|--|
|                              |   | Grams/Pounds       | Toxic Weighting Factor |  |
| Acetone                      | 139,244.2                                 | 2.21E-03           | 7.60E-06               | 0.0                                      |
| Benzene                      | 5.8                                       | 2.21E-03           | 1.80E-02               | 0.0                                      |
| Chloroform                   | 102.9                                     | 2.21E-03           | 2.10E-03               | 0.0                                      |
| 1,2-Dichloroethane           | 716.9                                     | 2.21E-03           | 6.20E-03               | 0.0                                      |
| Ethylbenzene                 | 336.3                                     | 2.21E-03           | 1.40E-03               | 0.0                                      |
| Methyl ethyl ketone          | 8,345.3                                   | 2.21E-03           | 2.20E-05               | 0.0                                      |
| Methyl isobutyl ketone       | 9,508.9                                   | 2.21E-03           | 1.20E-04               | 0.0                                      |
| Methylene chloride           | 99,646.9                                  | 2.21E-03           | 4.20E-04               | 0.1                                      |
| Tetrachloroethylene          | 589.6                                     | 2.21E-03           | 7.40E-02               | 0.1                                      |
| Toluene                      | 579.7                                     | 2.21E-03           | 5.60E-03               | 0.0                                      |
| 1,1,1-Trichloroethane        | 593.7                                     | 2.21E-03           | 4.30E-03               | 0.0                                      |
| Trichloroethylene            | 809.4                                     | 2.21E-03           | 6.30E-02               | 0.1                                      |
| m-Xylene                     | 589.6                                     | 2.21E-03           | 1.50E-03               | 0.0                                      |
| o+p-Xylene                   | 589.6                                     | 2.21E-03           | 8.50E-03               | 0.0                                      |
| alpha-Terpineol              | 589.5                                     | 2.21E-03           | 1.00E-03               | 0.0                                      |
| Benzoic acid                 | 125,488.9                                 | 2.21E-03           | 3.30E-04               | 0.1                                      |
| Benzyl alcohol               | 1,143.1                                   | 2.21E-03           | 5.60E-03               | 0.0                                      |
| bis (2-Ethylhexyl) phthalate | 263.1                                     | 2.21E-03           | 1.10E-01               | 0.1                                      |
| 2-Chlorophenol               | 783.5                                     | 2.21E-03           | 3.30E-02               | 0.1                                      |
| o-Cresol                     | 785.3                                     | 2.21E-03           | 3.30E-03               | 0.0                                      |
| p-Cresol                     | 795.9                                     | 2.21E-03           | 2.40E-03               | 0.0                                      |
| p-Cymene                     | 196.6                                     | 2.21E-03           | 4.30E-02               | 0.0                                      |
| n-Decane                     | 47.2                                      | 2.21E-03           | 4.30E-03               | 0.0                                      |
| 1,2-Dichlorobenzene          | 589.5                                     | 2.21E-03           | 1.10E-02               | 0.0                                      |
| Di-n-octyl phthalate         | 589.5                                     | 2.21E-03           | 2.20E-01               | 0.3                                      |
| n-Docosane                   | 171.0                                     | 2.21E-03           | 8.20E-05               | 0.0                                      |
| n-Dodecane                   | 76.7                                      | 2.21E-03           | 4.30E-03               | 0.0                                      |
| n-Eicosane                   | 351.0                                     | 2.21E-03           | 4.30E-03               | 0.0                                      |
| n-Hexacosane                 | 589.5                                     | 2.21E-03           | 8.20E-05               | 0.0                                      |
| n-Hexadecane                 | 50.1                                      | 2.21E-03           | 4.30E-03               | 0.0                                      |
| 2-Isopropynaphthalene        | 589.5                                     | 2.21E-03           | 9.80E-02               | 0.1                                      |
| 2-Methylnaphthalene          | 141.5                                     | 2.21E-03           | 1.80E-02               | 0.0                                      |
| Naphthalene                  | 57.3                                      | 2.21E-03           | 1.50E-02               | 0.0                                      |
| n-Octadecane                 | 100.2                                     | 2.21E-03           | 4.30E-03               | 0.0                                      |
| Styrene                      | 787.3                                     | 2.21E-03           | 1.40E-02               | 0.0                                      |
| n-Tetracosane                | 589.5                                     | 2.21E-03           | 8.20E-05               | 0.0                                      |
| n-Tetradecane                | 23.6                                      | 2.21E-03           | 4.30E-03               | 0.0                                      |
| n-Triacontane                | 589.5                                     | 2.21E-03           | 8.20E-05               | 0.0                                      |
| Azinphos ethyl               | 117.9                                     | 2.21E-03           | 5.10E+03               | 1,328.9                                  |
| Azinphos methyl              | 294.8                                     | 2.21E-03           | 2.80E+01               | 18.2                                     |
| Coumaphos                    | 294.8                                     | 2.21E-03           | 5.60E+03               | 3,648.1                                  |
| Dichlofenthion               | 117.9                                     | 2.21E-03           | 1.40E+01               | 3.6                                      |
| Disulfoton                   | 206.3                                     | 2.21E-03           | 1.20E+02               | 54.7                                     |
| EPN                          | 117.9                                     | 2.21E-03           | 7.60E+02               | 198.0                                    |
| Leptophos                    | 117.9                                     | 2.21E-03           | 1.10E+01               | 2.9                                      |

**TABLE B-2 (continued)**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**TRUCK CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical                | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        | Pound Equivalents Discharged at Baseline |
|-------------------------|---|--------------------|------------------------|--|
|                         |   | Grams/Pounds       | Toxic Weighting Factor |  |
| Merphos                 | 117.9                                     | 2.21E-03           | 2.50E+01               | 6.5                                      |
| Tetrachlorvinphos       | 117.9                                     | 2.21E-03           | 1.40E-01               | 0.0                                      |
| Beta-BHC                | 5.9                                       | 2.21E-03           | 1.20E+01               | 0.2                                      |
| Gamma-BHC               | 6.3                                       | 2.21E-03           | 7.00E+01               | 1.0                                      |
| Gamma-Chlordane         | 2.9                                       | 2.21E-03           | 2.30E+03               | 15.0                                     |
| Chlorobenzilate         | 59.0                                      | 2.21E-03           | 1.60E-01               | 0.0                                      |
| 4,4'-DDT                | 5.9                                       | 2.21E-03           | 6.50E+03               | 84.7                                     |
| Diallate                | 274.0                                     | 2.21E-03           | 8.40E-03               | 0.0                                      |
| Dieldrin                | 2.4                                       | 2.21E-03           | 5.70E+04               | 297.1                                    |
| Endosulfan II           | 59.0                                      | 2.21E-03           | 1.00E+02               | 13.0                                     |
| Endosulfan Sulfate      | 5.9                                       | 2.21E-03           | 1.00E+02               | 1.3                                      |
| Nitrofen                | 11.8                                      | 2.21E-03           | 4.80E-02               | 0.0                                      |
| Pentachloronitrobenzene | 2.9                                       | 2.21E-03           | 2.70E-01               | 0.0                                      |
| Simazine                | 471.6                                     | 2.21E-03           | 5.60E-01               | 0.6                                      |
| Terbutylazine           | 294.8                                     | 2.21E-03           | 1.20E-02               | 0.0                                      |
| 2,4-D                   | 249.5                                     | 2.21E-03           | 3.10E-03               | 0.0                                      |
| Dalapon                 | 2.4                                       | 2.21E-03           | 5.10E-03               | 0.0                                      |
| 2,4-DB (Butoxon)        | 117.9                                     | 2.21E-03           | 3.60E-02               | 0.0                                      |
| Dinoseb                 | 182.6                                     | 2.21E-03           | 1.90E+00               | 0.8                                      |
| MCPA                    | 21,484.3                                  | 2.21E-03           | 1.60E-02               | 0.8                                      |
| MCPP                    | 4,480.5                                   | 2.21E-03           | 6.90E-03               | 0.1                                      |
| Picloram                | 29.5                                      | 2.21E-03           | 2.10E+00               | 0.1                                      |
| 2,4,5-T                 | 59.9                                      | 2.21E-03           | 2.80E-01               | 0.0                                      |
| 2,4,5-TP                | 29.5                                      | 2.21E-03           | 1.80E-01               | 0.0                                      |
| Aluminum                | 11,496.3                                  | 2.21E-03           | 6.40E-02               | 1.6                                      |
| Boron                   | 16,065.0                                  | 2.21E-03           | 1.80E-01               | 6.4                                      |
| Chromium                | 1,147.9                                   | 2.21E-03           | 2.70E-02               | 0.1                                      |
| Copper                  | 5,103.4                                   | 2.21E-03           | 4.70E-01               | 5.3                                      |
| Manganese               | 12,282.1                                  | 2.21E-03           | 1.40E-02               | 0.4                                      |
| Mercury                 | 12.4                                      | 2.21E-03           | 5.00E+02               | 13.7                                     |
| Tin                     | 381,824.8                                 | 2.21E-03           | 3.00E-01               | 253.1                                    |
| Titanium                | 1,124.3                                   | 2.21E-03           | 2.90E-02               | 0.1                                      |
| Zinc                    | 672.1                                     | 2.21E-03           | 5.10E-02               | 0.1                                      |
| Fluoride                | 1,081.7                                   | 2.21E-03           | 3.50E-02               | 0.1                                      |
| Total Cyanide           | 629.0                                     | 2.21E-03           | 1.10E+00               | 1.5                                      |
| <br>                    |   |                    |                        |  |
| Total                   | 857,829<br>(1,896 pounds)                 |                    |                        | 5,959.1                                  |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-3**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**TRUCK CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                     | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|------------------------------|---|--------------------|------------------------|---------------------|--|
|                              |   | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Acetone                      | 96,442,328                                | 2.21E-03           | 7.60E-06               | 1.63E-01            | 0.3                                      |
| Benzene                      | 85,882                                    | 2.21E-03           | 1.80E-02               | 5.24E-02            | 0.2                                      |
| Chloroform                   | 171,522                                   | 2.21E-03           | 2.10E-03               | 2.66E-01            | 0.2                                      |
| 1,2-Dichloroethane           | 1,093,205                                 | 2.21E-03           | 6.20E-03               | 1.10E-01            | 1.6                                      |
| Ethylbenzene                 | 942,392                                   | 2.21E-03           | 1.40E-03               | 6.21E-02            | 0.2                                      |
| Methyl ethyl ketone          | 17,338,690                                | 2.21E-03           | 2.20E-05               | 8.17E-02            | 0.1                                      |
| Methyl isobutyl ketone       | 5,285,811                                 | 2.21E-03           | 1.20E-04               | 1.21E-01            | 0.2                                      |
| Methylene chloride           | 31,527,325                                | 2.21E-03           | 4.20E-04               | 4.57E-01            | 13.4                                     |
| Tetrachloroethylene          | 2,076,223                                 | 2.21E-03           | 7.40E-02               | 1.54E-01            | 52.3                                     |
| Toluene                      | 3,638,316                                 | 2.21E-03           | 5.60E-03               | 3.82E-02            | 1.7                                      |
| 1,1,1-Trichloroethane        | 1,347,806                                 | 2.21E-03           | 4.30E-03               | 9.55E-02            | 1.2                                      |
| Trichloroethylene            | 52,142                                    | 2.21E-03           | 6.30E-02               | 1.30E-01            | 0.9                                      |
| m-Xylene                     | 3,737,758                                 | 2.21E-03           | 1.50E-03               | 3.46E-01            | 4.3                                      |
| o+p-Xylene                   | 1,961,522                                 | 2.21E-03           | 8.50E-03               | 4.93E-02            | 1.8                                      |
| alpha-Terpineol              | 797,114                                   | 2.21E-03           | 1.00E-03               | 5.40E-02            | 0.1                                      |
| Benzoic acid                 | 80,202,259                                | 2.21E-03           | 3.30E-04               | 1.95E-01            | 11.4                                     |
| Benzyl alcohol               | 500,434                                   | 2.21E-03           | 5.60E-03               | 2.20E-01            | 1.4                                      |
| bis (2-Ethylhexyl) phthalate | 915,812                                   | 2.21E-03           | 1.10E-01               | 4.02E-01            | 89.5                                     |
| 2-Chlorophenol               | 123,022                                   | 2.21E-03           | 3.30E-02               | 5.00E-02            | 0.4                                      |
| o-Cresol                     | 145,472                                   | 2.21E-03           | 3.30E-03               | 4.75E-01            | 0.5                                      |
| p-Cresol                     | 238,831                                   | 2.21E-03           | 2.40E-03               | 2.83E-01            | 0.4                                      |
| p-Cymene                     | 122,727                                   | 2.21E-03           | 4.30E-02               | 2.10E-03            | 0.0                                      |
| n-Decane                     | 628,812                                   | 2.21E-03           | 4.30E-03               | 9.10E-01            | 5.4                                      |
| 1,2-Dichlorobenzene          | 186,160                                   | 2.21E-03           | 1.10E-02               | 1.10E-01            | 0.5                                      |
| Di-n-octyl phthalate         | 309,430                                   | 2.21E-03           | 2.20E-01               | 1.70E-01            | 25.6                                     |
| n-Docosane                   | 197,367                                   | 2.21E-03           | 8.20E-05               | 1.20E-01            | 0.0                                      |
| n-Dodecane                   | 1,973,579                                 | 2.21E-03           | 4.30E-03               | 4.95E-02            | 0.9                                      |
| n-Eicosane                   | 549,214                                   | 2.21E-03           | 4.30E-03               | 7.60E-02            | 0.4                                      |
| n-Hexacosane                 | 264,605                                   | 2.21E-03           | 8.20E-05               | 2.89E-01            | 0.0                                      |
| n-Hexadecane                 | 1,245,164                                 | 2.21E-03           | 4.30E-03               | 2.89E-01            | 3.4                                      |
| 2-Isopropylnaphthalene       | 331,843                                   | 2.21E-03           | 9.80E-02               | 7.20E-01            | 51.7                                     |
| 2-Methylnaphthalene          | 135,731                                   | 2.21E-03           | 1.80E-02               | 7.20E-01            | 3.9                                      |
| Naphthalene                  | 556,528                                   | 2.21E-03           | 1.50E-02               | 5.31E-02            | 1.0                                      |
| n-Octadecane                 | 684,844                                   | 2.21E-03           | 4.30E-03               | 2.89E-01            | 1.9                                      |
| Styrene                      | 6,712,512                                 | 2.21E-03           | 1.40E-02               | 6.35E-02            | 13.2                                     |
| n-Tetracosane                | 326,240                                   | 2.21E-03           | 8.20E-05               | 2.89E-01            | 0.0                                      |
| n-Tetradecane                | 852,940                                   | 2.21E-03           | 4.30E-03               | 2.89E-01            | 2.3                                      |
| n-Triacontane                | 387,875                                   | 2.21E-03           | 8.20E-05               | 2.89E-01            | 0.0                                      |
| Azinphos ethyl               | 7,609                                     | 2.21E-03           | 5.10E+03               | 1.00E+00            | 85,761.1                                 |
| Azinphos methyl              | 12,428                                    | 2.21E-03           | 2.80E+01               | 2.60E-01            | 200.0                                    |
| Coumaphos                    | 16,645                                    | 2.21E-03           | 5.60E+03               | 1.00E+00            | 205,996.7                                |
| Dichlofenthion               | 7,015                                     | 2.21E-03           | 1.40E+01               | 1.00E+00            | 217.1                                    |
| Disulfoton                   | 49,838                                    | 2.21E-03           | 1.20E+02               | 1.00E+00            | 13,217.1                                 |
| EPN                          | 10,337                                    | 2.21E-03           | 7.60E+02               | 1.00E+00            | 17,361.5                                 |
| Leptophos                    | 12,578                                    | 2.21E-03           | 1.10E+01               | 1.00E+00            | 305.8                                    |

**TABLE B-3 (continued)**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**TRUCK CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|-------------------------|---|--------------------|------------------------|---------------------|--|
|                         |   | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Merphos                 | 7,368                                     | 2.21E-03           | 2.50E+01               | 1.00E+00            | 407.1                                    |
| Tetrachlorvinphos       | 6,255                                     | 2.21E-03           | 1.40E-01               | 1.00E+00            | 1.9                                      |
| Beta-BHC                | 853                                       | 2.21E-03           | 1.20E+01               | 5.70E-01            | 12.9                                     |
| Gamma-BHC               | 772                                       | 2.21E-03           | 7.00E+01               | 4.80E-01            | 57.4                                     |
| Gamma-Chlordane         | 410                                       | 2.21E-03           | 2.30E+03               | 5.00E-01            | 1,041.3                                  |
| Chlorobenzilate         | 8,651                                     | 2.21E-03           | 1.60E-01               | 1.00E+00            | 3.1                                      |
| 4,4'-DDT                | 741                                       | 2.21E-03           | 6.50E+03               | 4.00E-01            | 4,257.6                                  |
| Diallate                | 48,621                                    | 2.21E-03           | 8.40E-03               | 1.00E+00            | 0.9                                      |
| Dieldrin                | 319                                       | 2.21E-03           | 5.70E+04               | 1.40E-01            | 5,622.3                                  |
| Endosulfan II           | 7,410                                     | 2.21E-03           | 1.00E+02               | 5.00E-01            | 818.8                                    |
| Endosulfan Sulfate      | 741                                       | 2.21E-03           | 1.00E+02               | 4.20E-01            | 68.8                                     |
| Nitrofen                | 1,538                                     | 2.21E-03           | 4.80E-02               | 1.00E+00            | 0.2                                      |
| Pentachloronitrobenzene | 13,510                                    | 2.21E-03           | 2.70E-01               | 1.00E+00            | 8.1                                      |
| Simazine                | 66,001                                    | 2.21E-03           | 5.60E-01               | 1.00E+00            | 81.7                                     |
| Terbutylazine           | 37,608                                    | 2.21E-03           | 1.20E-02               | 1.00E+00            | 1.0                                      |
| 2,4-D                   | 8,445                                     | 2.21E-03           | 3.10E-03               | 5.10E-01            | 0.0                                      |
| Dalapon                 | 3,071                                     | 2.21E-03           | 5.10E-03               | 1.00E+00            | 0.0                                      |
| 2,4-DB (Butoxon)        | 19,596                                    | 2.21E-03           | 3.60E-02               | 1.00E+00            | 1.6                                      |
| Dinoseb                 | 6,842                                     | 2.21E-03           | 1.90E+00               | 1.00E+00            | 28.7                                     |
| MCPA                    | 1,607,248                                 | 2.21E-03           | 1.60E-02               | 1.00E+00            | 56.8                                     |
| MCPP                    | 451,233                                   | 2.21E-03           | 6.90E-03               | 1.00E+00            | 6.9                                      |
| Picloram                | 2,696                                     | 2.21E-03           | 2.10E+00               | 1.00E+00            | 12.5                                     |
| 2,4,5-T                 | 2,497                                     | 2.21E-03           | 2.80E-01               | 4.40E-01            | 0.7                                      |
| 2,4,5-TP                | 1,598                                     | 2.21E-03           | 1.80E-01               | 5.60E-01            | 0.4                                      |
| Aluminum                | 12,419,050                                | 2.21E-03           | 6.40E-02               | 1.20E-01            | 210.8                                    |
| Boron                   | 10,856,556                                | 2.21E-03           | 1.80E-01               | 7.70E-01            | 3,325.4                                  |
| Chromium                | 3,386,535                                 | 2.21E-03           | 2.70E-02               | 3.30E-01            | 66.7                                     |
| Copper                  | 528,289                                   | 2.21E-03           | 4.70E-01               | 1.60E-01            | 87.8                                     |
| Manganese               | 718,880                                   | 2.21E-03           | 1.40E-02               | 5.90E-01            | 13.1                                     |
| Mercury                 | 2,989                                     | 2.21E-03           | 5.00E+02               | 4.00E-01            | 1,321.0                                  |
| Tin                     | 40,092,193                                | 2.21E-03           | 3.00E-01               | 3.50E-01            | 9,303.4                                  |
| Titanium                | 350,047                                   | 2.21E-03           | 2.90E-02               | 3.12E-01            | 7.0                                      |
| Zinc                    | 1,023,506                                 | 2.21E-03           | 5.10E-02               | 2.20E-01            | 25.4                                     |
| Fluoride                | 68,344,188                                | 2.21E-03           | 3.50E-02               | 3.90E-01            | 2,061.7                                  |
| Total Cyanide           | 63,128                                    | 2.21E-03           | 1.10E+00               | 2.96E-01            | 45.4                                     |
| <br>                    |   |                    |                        |                     |  |
| Total                   | 404,295,270<br>(893,493 pounds)           |                    |                        |                     | 352,309.7                                |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-4**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**RAIL CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical             | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        | Pound Equivalents Discharged at Baseline |
|----------------------|---|--------------------|------------------------|--|
|                      |   | Grams/Pounds       | Toxic Weighting Factor |  |
| Acetone              | 58  | 2.21E-03           | 7.60E-06               | 0.0                                      |
| Ethylbenzene         | 7   | 2.21E-03           | 1.40E-03               | 0.0                                      |
| Methyl ethyl ketone  | 314                                       | 2.21E-03           | 2.20E-05               | 0.0                                      |
| m-Xylene             | 14  | 2.21E-03           | 1.50E-03               | 0.0                                      |
| o+p-Xylene           | 17  | 2.21E-03           | 8.50E-03               | 0.0                                      |
| Anthracene           | 240                                       | 2.21E-03           | 2.50E+00               | 1.3                                      |
| Benzoic acid         | 228                                       | 2.21E-03           | 3.30E-04               | 0.0                                      |
| Biphenyl             | 51  | 2.21E-03           | 3.70E-02               | 0.0                                      |
| Carbazole            | 203                                       | 2.21E-03           | 2.70E+01               | 12.1                                     |
| p-Cresol             | 85  | 2.21E-03           | 2.40E-03               | 0.0                                      |
| 2,4-Diaminotoluene   | 3,330                                     | 2.21E-03           | 1.80E-01               | 1.3                                      |
| n-Docosane           | 156                                       | 2.21E-03           | 8.20E-05               | 0.0                                      |
| n-Dodecane           | 99  | 2.21E-03           | 4.30E-03               | 0.0                                      |
| n-Eicosane           | 488                                       | 2.21E-03           | 4.30E-03               | 0.0                                      |
| Fluoranthene         | 222                                       | 2.21E-03           | 9.20E-01               | 0.5                                      |
| n-Hexacosane         | 277                                       | 2.21E-03           | 8.20E-05               | 0.0                                      |
| n-Hexadecane         | 362                                       | 2.21E-03           | 4.30E-03               | 0.0                                      |
| 2-Methylnaphthalene  | 44  | 2.21E-03           | 1.80E-02               | 0.0                                      |
| 1-Methyphenanthrene  | 179                                       | 2.21E-03           | 1.40E-01               | 0.1                                      |
| Naphthalene          | 7   | 2.21E-03           | 1.50E-02               | 0.0                                      |
| n-Octacosane         | 165                                       | 2.21E-03           | 8.20E-05               | 0.0                                      |
| n-Octadecane         | 440                                       | 2.21E-03           | 4.30E-03               | 0.0                                      |
| Phenanthere          | 481                                       | 2.21E-03           | 1.90E+01               | 20.2                                     |
| Phenol               | 98  | 2.21E-03           | 2.80E-02               | 0.0                                      |
| Pyrene               | 174                                       | 2.21E-03           | 7.50E-02               | 0.0                                      |
| Styrene              | 1   | 2.21E-03           | 1.40E-02               | 0.0                                      |
| n-Tetracosane        | 462                                       | 2.21E-03           | 8.20E-05               | 0.0                                      |
| n-Tetradecane        | 118                                       | 2.21E-03           | 4.30E-03               | 0.0                                      |
| n-Triacontane        | 172                                       | 2.21E-03           | 8.20E-05               | 0.0                                      |
| Dioxathion           | 14  | 2.21E-03           | 6.22E+01               | 1.9                                      |
| Tetrachlorvinphos    | 4   | 2.21E-03           | 1.40E-01               | 0.0                                      |
| Tokuthion            | 6   | 2.21E-03           | 9.30E-03               | 0.0                                      |
| Trichlorfon          | 14  | 2.21E-03           | 7.00E+02               | 21.8                                     |
| Trichloronate        | 4   | 2.21E-03           | 5.60E+03               | 48.1                                     |
| Trimethylphosphate   | 6   | 2.21E-03           | 1.90E-03               | 0.0                                      |
| Acephate             | 1,369                                     | 2.21E-03           | 1.30E-02               | 0.0                                      |
| Alachlor             | 0   | 2.21E-03           | 1.60E-02               | 0.0                                      |
| Atrazine             | 174                                       | 2.21E-03           | 9.40E-02               | 0.0                                      |
| Benefluralin         | 4   | 2.21E-03           | 1.60E-01               | 0.0                                      |
| Alpha-BHC            | 0   | 2.21E-03           | 4.30E+01               | 0.0                                      |
| Beta-BHC             | 54  | 2.21E-03           | 1.20E+01               | 1.4                                      |
| Delta-BHC            | 1   | 2.21E-03           | 8.60E-02               | 0.0                                      |
| Gamma-BHC            | 1   | 2.21E-03           | 7.00E+01               | 0.1                                      |
| Bromacil             | 2   | 2.21E-03           | 5.60E-03               | 0.0                                      |
| Bromoxynil octanoate | 1   | 2.21E-03           | 1.10E+00               | 0.0                                      |
| Butachlor            | 1   | 2.21E-03           | 7.40E-03               | 0.0                                      |
| Captafol             | 4   | 2.21E-03           | 2.70E+00               | 0.0                                      |
| Captan               | 2   | 2.21E-03           | 1.60E+00               | 0.0                                      |
| Carbophenothion      | 2   | 2.21E-03           | 6.60E-01               | 0.0                                      |
| Alpha-Chlordane      | 0   | 2.21E-03           | 2.30E+03               | 0.9                                      |
| Gamma-Chlordane      | 0   | 2.21E-03           | 2.30E+03               | 0.8                                      |
| Chlorobenzilate      | 2   | 2.21E-03           | 1.60E-01               | 0.0                                      |
| Chloroneb            | 41  | 2.21E-03           | 4.70E-03               | 0.0                                      |
| Dacthal (DCPA)       | 1   | 2.21E-03           | 9.50E-03               | 0.0                                      |
| 4,4'-DDD             | 0   | 2.21E-03           | 7.60E+02               | 0.7                                      |

TABLE B-4 (continued)

**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**RAIL CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical                | Pollutants<br>Discharged at<br>Baseline<br>(grams) | Conversion Factors |                              | Pound<br>Equivalents<br>Discharged<br>at Baseline |
|-------------------------|--|--------------------|------------------------------|---|
|                         |  | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor |   |
| 4,4'-DDE                | 0  | 2.21E-03           | 9.50E+02                     | 0.6   |
| 4,4'-DDT                | 0  | 2.21E-03           | 6.50E+03                     | 6.9   |
| Diallate                | 592  | 2.21E-03           | 8.40E-03                     | 0.0   |
| Dichlalone              | 2  | 2.21E-03           | 4.00E+01                     | 0.2   |
| Dicofol                 | 3  | 2.21E-03           | 5.70E+02                     | 3.5   |
| Dieldrin                | 3  | 2.21E-03           | 5.70E+04                     | 419.5   |
| Endosulfan I            | 0  | 2.21E-03           | 1.00E+02                     | 0.0   |
| Endosulfan Sulfate      | 0  | 2.21E-03           | 1.00E+02                     | 0.1   |
| Endrin                  | 0  | 2.21E-03           | 9.80E+01                     | 0.1   |
| Endrin aldehyde         | 1  | 2.21E-03           | 9.80E+01                     | 0.1   |
| Endrin ketone           | 0  | 2.21E-03           | 9.80E+01                     | 0.1   |
| Ethalfluralin           | 8  | 2.21E-03           | 7.50E+00                     | 0.1   |
| Etradiazole             | 0  | 2.21E-03           | 4.60E-03                     | 0.0   |
| Fenarimol               | 1  | 2.21E-03           | 6.20E-02                     | 0.0   |
| Heptachlor epoxide      | 0  | 2.21E-03           | 6.80E+03                     | 4.2   |
| Isodrin                 | 0  | 2.21E-03           | 1.40E+01                     | 0.0   |
| Isopropalin             | 1  | 2.21E-03           | 5.80E-01                     | 0.0   |
| Methoxychlor            | 1  | 2.21E-03           | 1.90E+02                     | 0.2   |
| Metrribuzin             | 0  | 2.21E-03           | 1.30E-03                     | 0.0   |
| Mirex                   | 1  | 2.21E-03           | 5.60E+03                     | 17.2  |
| Nitrofen                | 2  | 2.21E-03           | 4.80E-02                     | 0.0   |
| Pendamethalin           | 1  | 2.21E-03           | 1.50E-01                     | 0.0   |
| Pentachloronitrobenzene | 0  | 2.21E-03           | 2.70E-01                     | 0.0   |
| CIS-Permethrin          | 9  | 2.21E-03           | 3.40E+00                     | 0.1   |
| Perthane                | 81   | 2.21E-03           | 1.40E+01                     | 2.5   |
| Propachlor              | 26   | 2.21E-03           | 3.30E-01                     | 0.0   |
| Propazine               | 28   | 2.21E-03           | 4.70E-03                     | 0.0   |
| Simazine                | 49,949   | 2.21E-03           | 5.60E-01                     | 61.8  |
| Stobane                 | 96   | 2.21E-03           | 1.10E+02                     | 23.4  |
| Terbacil                | 41   | 2.21E-03           | 8.00E-01                     | 0.1   |
| Terbutylazine           | 4,255  | 2.21E-03           | 1.20E-02                     | 0.1   |
| Triadimenfon            | 2  | 2.21E-03           | 5.80E-03                     | 0.0   |
| Trifluralin             | 3  | 2.21E-03           | 4.20E+00                     | 0.0   |
| 2,4-D                   | 118  | 2.21E-03           | 3.10E-03                     | 0.0   |
| Dalapon                 | 28   | 2.21E-03           | 5.10E-03                     | 0.0   |
| 2,4-DB (Butoxon)        | 203  | 2.21E-03           | 3.60E-02                     | 0.0   |
| Dicamba                 | 888  | 2.21E-03           | 1.50E-02                     | 0.0   |
| Dichloroprop            | 115  | 2.21E-03           | 9.30E-02                     | 0.0   |
| Dinoseb                 | 50   | 2.21E-03           | 1.90E+00                     | 0.2   |
| MCPA                    | 4,255  | 2.21E-03           | 1.60E-02                     | 0.2   |
| MCPP                    | 59,199   | 2.21E-03           | 6.90E-03                     | 0.9   |
| Picloram                | 37   | 2.21E-03           | 2.10E+00                     | 0.2   |
| 2,4,5-T                 | 20   | 2.21E-03           | 2.80E-01                     | 0.0   |
| 2,4,5-TP                | 20   | 2.21E-03           | 1.80E-01                     | 0.0   |
| Aluminum                | 25,118   | 2.21E-03           | 6.40E-02                     | 3.6   |
| Barium                  | 1,472  | 2.21E-03           | 2.00E-03                     | 0.0   |
| Chromium                | 103  | 2.21E-03           | 2.70E-02                     | 0.0   |
| Copper                  | 208  | 2.21E-03           | 4.70E-01                     | 0.2   |
| Titanium                | 235  | 2.21E-03           | 2.90E-02                     | 0.0   |
| Zinc                    | 961  | 2.21E-03           | 5.10E-02                     | 0.1   |
| Fluoride                | 4,682  | 2.21E-03           | 3.50E-02                     | 0.4   |
| Total                   |  | 163,023            |                              | 657.9   |

Note: Pound Equivalent Removals are rounded to the nearest 0.1 pounds.

**TABLE B-5**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**RAIL CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical             | Pollutants<br>Discharged at<br>Baseline<br>(grams) | Conversion Factors |                              |                           | Pound<br>Equivalents<br>Discharged<br>at Baseline |
|----------------------|--|--------------------|------------------------------|---------------------------|---|
|                      |  | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor | POTW<br>Removal<br>Factor |   |
| Ethylbenzene         | 32,167   | 2.21E-03           | 1.40E-03                     | 6.21E-02                  | 0.0   |
| Methyl ethyl ketone  | 114,008  | 2.21E-03           | 2.20E-05                     | 8.17E-02                  | 0.0   |
| m-Xylene             | 70,800   | 2.21E-03           | 1.50E-03                     | 3.46E-01                  | 0.1   |
| o+p-Xylene           | 46,852   | 2.21E-03           | 8.50E-03                     | 4.93E-02                  | 0.0   |
| Anthracene           | 36,487   | 2.21E-03           | 2.50E+00                     | 4.00E-02                  | 8.1   |
| Benzoic acid         | 879,737  | 2.21E-03           | 3.30E-04                     | 1.95E-01                  | 0.1   |
| Carbazole            | 30,963   | 2.21E-03           | 2.70E-01                     | 1.00E+00                  | 18.5  |
| p-Cresol             | 15,385   | 2.21E-03           | 2.40E-03                     | 2.83E-01                  | 0.0   |
| 2,4-Diaminotoluene   | 569,614  | 2.21E-03           | 1.80E-01                     | 1.00E+00                  | 226.6   |
| n-Docosane           | 81,843   | 2.21E-03           | 8.20E-05                     | 1.20E-01                  | 0.0   |
| n-Dodecane           | 102,159  | 2.21E-03           | 4.30E-03                     | 4.95E-02                  | 0.0   |
| n-Eicosane           | 319,690  | 2.21E-03           | 4.30E-03                     | 7.60E-02                  | 0.2   |
| Fluoranthene         | 33,406   | 2.21E-03           | 9.20E-01                     | 5.80E-01                  | 39.4  |
| n-Hexacosane         | 43,405   | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0   |
| n-Hexadecane         | 645,916  | 2.21E-03           | 4.30E-03                     | 2.89E-01                  | 1.8   |
| 1-Methylphenanthrene | 27,585   | 2.21E-03           | 1.40E-01                     | 5.00E-02                  | 0.4   |
| Naphthalene          | 19,634   | 2.21E-03           | 1.50E-02                     | 5.31E-02                  | 0.0   |
| n-Octacosane         | 26,475   | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0   |
| n-Octadecane         | 379,599  | 2.21E-03           | 4.30E-03                     | 2.89E-01                  | 1.0   |
| Phenanthrene         | 73,736   | 2.21E-03           | 1.90E+01                     | 5.11E-02                  | 158.2   |
| Phenol               | 156,926  | 2.21E-03           | 2.80E-02                     | 4.75E-02                  | 0.5   |
| Pyrene               | 26,189   | 2.21E-03           | 7.50E-02                     | 5.00E-02                  | 0.2   |
| Styrene              | 49,647   | 2.21E-03           | 1.40E-02                     | 6.35E-02                  | 0.1   |
| n-Tetracosane        | 71,662   | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0   |
| n-Tetradecane        | 435,146  | 2.21E-03           | 4.30E-03                     | 2.89E-01                  | 1.2   |
| n-Triacontane        | 28,482   | 2.21E-03           | 8.20E-05                     | 2.89E-01                  | 0.0   |
| Dioxathion           | 2,068  | 2.21E-03           | 6.22E+01                     | 1.00E+00                  | 284.3   |
| Tetrachlorvinphos    | 654  | 2.21E-03           | 1.40E-01                     | 1.00E+00                  | 0.2   |
| Tokuthion            | 877  | 2.21E-03           | 9.30E-03                     | 1.00E+00                  | 0.0   |
| Trichlorfon          | 2,151  | 2.21E-03           | 7.00E+02                     | 1.00E+00                  | 3,327.6   |
| Trichloronate        | 600  | 2.21E-03           | 5.60E+03                     | 1.00E+00                  | 7,425.0   |
| Trimethylphosphate   | 960  | 2.21E-03           | 1.90E-03                     | 1.00E+00                  | 0.0   |
| Acephate             | 217,802  | 2.21E-03           | 1.30E-02                     | 1.00E+00                  | 6.3   |
| Alachlor             | 71   | 2.21E-03           | 1.60E-02                     | 1.00E+00                  | 0.0   |
| Atrazine             | 29,747   | 2.21E-03           | 9.40E-02                     | 5.80E-01                  | 3.6   |
| Benefluralin         | 445  | 2.21E-03           | 1.60E-01                     | 1.00E+00                  | 0.2   |
| Alpha-BHC            | 35   | 2.21E-03           | 4.30E+01                     | 3.60E-01                  | 1.2   |
| Beta-BHC             | 8,008  | 2.21E-03           | 1.20E+01                     | 5.70E-01                  | 121.0   |
| Delta-BHC            | 129  | 2.21E-03           | 2.80E-01                     | 1.00E+00                  | 0.1   |
| Gamma-BHC            | 91   | 2.21E-03           | 7.00E+01                     | 4.80E-01                  | 6.8   |

**TABLE B-5 (continued)**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**RAIL CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                | Pollutants<br>Discharged at<br>Baseline<br>(grams) | Conversion Factors |                              |                           | Pound<br>Equivalents<br>Discharged<br>at Baseline |
|-------------------------|--|--------------------|------------------------------|---------------------------|---|
|                         |  | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factor | POTW<br>Removal<br>Factor |   |
| Bromacil                | 336  | 2.21E-03           | 5.60E-03                     | 1.00E+00                  | 0.0   |
| Bromoxynil octanoate    | 168  | 2.21E-03           | 1.10E+00                     | 1.00E+00                  | 0.4   |
| Butachlor               | 137  | 2.21E-03           | 7.40E-03                     | 1.00E+00                  | 0.0   |
| Captafol                | 540  | 2.21E-03           | 2.70E+00                     | 1.00E+00                  | 3.2   |
| Captan                  | 338  | 2.21E-03           | 1.60E+00                     | 1.00E+00                  | 1.2   |
| Carbophenothion         | 284  | 2.21E-03           | 6.60E-01                     | 1.00E+00                  | 0.4   |
| Alpha-Chlordane         | 28   | 2.21E-03           | 2.30E+03                     | 5.00E-01                  | 71.2  |
| Gamma-Chlordane         | 23   | 2.21E-03           | 2.30E+03                     | 5.00E-01                  | 59.0  |
| Chlorobenzilate         | 348  | 2.21E-03           | 1.60E-01                     | 1.00E+00                  | 0.1   |
| Chloroneb               | 6,962  | 2.21E-03           | 4.70E-03                     | 1.00E+00                  | 0.1   |
| Dacthal (DCPA)          | 91   | 2.21E-03           | 9.50E-03                     | 1.00E+00                  | 0.0   |
| 4,4'-DDD                | 68   | 2.21E-03           | 7.60E+02                     | 1.00E+00                  | 113.9   |
| 4,4'-DDE                | 47   | 2.21E-03           | 9.50E+02                     | 1.00E+00                  | 99.7  |
| 4,4'-DDT                | 55   | 2.21E-03           | 6.50E+03                     | 4.00E-01                  | 314.5   |
| Diallate                | 70,417   | 2.21E-03           | 8.40E-03                     | 1.00E+00                  | 1.3   |
| Dichlone                | 348  | 2.21E-03           | 4.00E+01                     | 1.00E+00                  | 30.8  |
| Dicofol                 | 426  | 2.21E-03           | 5.70E+02                     | 1.00E+00                  | 537.3   |
| Dieldrin                | 375  | 2.21E-03           | 5.70E+04                     | 1.40E-01                  | 6,609.7   |
| Endosulfan I            | 35   | 2.21E-03           | 1.00E+02                     | 5.00E-01                  | 3.8   |
| Endosulfan Sulfate      | 59   | 2.21E-03           | 1.00E+02                     | 4.20E-01                  | 5.4   |
| Endrin                  | 71   | 2.21E-03           | 9.80E+01                     | 5.00E-01                  | 7.7   |
| Endrin aldehyde         | 126  | 2.21E-03           | 9.80E+01                     | 1.00E+00                  | 27.3  |
| Endrin ketone           | 35   | 2.21E-03           | 9.80E-01                     | 1.00E+00                  | 0.1   |
| Ethalfluralin           | 1,329  | 2.21E-03           | 7.50E+00                     | 1.00E+00                  | 22.0  |
| Etradiazole             | 47   | 2.21E-03           | 4.60E-03                     | 1.00E+00                  | 0.0   |
| Fenarimol               | 90   | 2.21E-03           | 6.20E-02                     | 1.00E+00                  | 0.0   |
| Heptachlor epoxide      | 38   | 2.21E-03           | 6.80E+03                     | 1.00E+00                  | 568.6   |
| Isodrin                 | 45   | 2.21E-03           | 1.40E+01                     | 1.00E+00                  | 1.4   |
| Isopropalin             | 157  | 2.21E-03           | 5.80E-01                     | 1.00E+00                  | 0.2   |
| Methoxychlor            | 98   | 2.21E-03           | 1.90E+02                     | 4.20E-01                  | 17.3  |
| Metribuzin              | 40   | 2.21E-03           | 1.30E-03                     | 1.00E+00                  | 0.0   |
| Mirex                   | 237  | 2.21E-03           | 5.60E+03                     | 1.00E+00                  | 2,937.3   |
| Nitrofen                | 209  | 2.21E-03           | 4.80E-02                     | 1.00E+00                  | 0.0   |
| Pendamethalin           | 191  | 2.21E-03           | 1.50E-01                     | 1.00E+00                  | 0.1   |
| Pentachloronitrobenzene | 89   | 2.21E-03           | 2.70E-01                     | 1.00E+00                  | 0.1   |
| CIS-Permethrin          | 1,058  | 2.21E-03           | 3.40E+00                     | 1.00E+00                  | 8.0   |
| Perthane                | 12,263   | 2.21E-03           | 1.40E+01                     | 1.00E+00                  | 379.4   |
| Propachlor              | 3,927  | 2.21E-03           | 3.30E-01                     | 1.00E+00                  | 2.9   |
| Propazine               | 4,201  | 2.21E-03           | 4.70E-03                     | 1.00E+00                  | 0.0   |
| Simazine                | 6,678,059  | 2.21E-03           | 5.60E-01                     | 1.00E+00                  | 8,264.8   |

**TABLE B-5 (continued)**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**RAIL CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical         | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|------------------|---|--------------------|------------------------|---------------------|--|
|                  |   | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Strobane         | 14,444                                    | 2.21E-03           | 1.10E+02               | 1.00E+00            | 3,511.4                                  |
| Terbacil         | 6,114                                     | 2.21E-03           | 8.00E-01               | 1.00E+00            | 10.8                                     |
| Terbutylazine    | 728,051                                   | 2.21E-03           | 1.20E-02               | 1.00E+00            | 19.3                                     |
| Triadimefon      | 274                                       | 2.21E-03           | 5.80E-03               | 1.00E+00            | 0.0                                      |
| Trifluralin      | 273                                       | 2.21E-03           | 4.20E+00               | 2.90E-01            | 0.7                                      |
| 2,4-D            | 12,400                                    | 2.21E-03           | 3.10E-03               | 5.10E-01            | 0.0                                      |
| Dalapon          | 4,213                                     | 2.21E-03           | 5.10E-03               | 1.00E+00            | 0.0                                      |
| 2,4-DB (Butoxon) | 22,522                                    | 2.21E-03           | 3.60E-02               | 1.00E+00            | 1.8                                      |
| Dicamba          | 67,164                                    | 2.21E-03           | 1.50E-02               | 1.00E+00            | 2.2                                      |
| Dichloroprop     | 14,445                                    | 2.21E-03           | 9.30E-02               | 1.00E+00            | 3.0                                      |
| Dinoseb          | 5,003                                     | 2.21E-03           | 1.90E+00               | 1.00E+00            | 21.0                                     |
| MCPA             | 404,082                                   | 2.21E-03           | 1.60E-02               | 1.00E+00            | 14.3                                     |
| MCPP             | 5,222,382                                 | 2.21E-03           | 6.90E-03               | 1.00E+00            | 79.6                                     |
| Picloram         | 6,343                                     | 2.21E-03           | 2.10E+00               | 1.00E+00            | 29.4                                     |
| 2,4,5-T          | 2,170                                     | 2.21E-03           | 2.80E-01               | 4.40E-01            | 0.6                                      |
| 2,4,5-TP         | 1,722                                     | 2.21E-03           | 1.80E-01               | 5.60E-01            | 0.4                                      |
| Aluminum         | 3,796,352                                 | 2.21E-03           | 6.40E-02               | 1.20E-01            | 64.4                                     |
| Barium           | 147,364                                   | 2.21E-03           | 2.00E-03               | 6.40E-01            | 0.4                                      |
| Chromium         | 24,499                                    | 2.21E-03           | 2.70E-02               | 3.30E-01            | 0.5                                      |
| Copper           | 19,440                                    | 2.21E-03           | 4.70E-01               | 1.59E-01            | 3.2                                      |
| Titanium         | 17,754                                    | 2.21E-03           | 2.90E-02               | 3.12E-01            | 0.4                                      |
| Zinc             | 79,744                                    | 2.21E-03           | 5.10E-02               | 2.20E-01            | 2.0                                      |
| Fluoride         | 852,497                                   | 2.21E-03           | 3.50E-02               | 3.90E-01            | 25.7                                     |
| Total            | 22,813,796<br>(50,418 pounds)             |                    |                        |                     | 35,513.1                                 |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-6**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**BARGE CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical                     | Pollutants Discharged at Baseline (grams) | Conversion Factors |                         | Pound Equivalents Discharged at Baseline |
|------------------------------|---|--------------------|-------------------------|--|
|                              |   | Grams/Pounds       | Toxic Weighting Factors |  |
| Acetone                      | 3,480,118                                 | 2.21E-03           | 7.6E-06                 | 0.1                                      |
| Acrylonitrile                | 2,330,312                                 | 2.21E-03           | 8.5E-01                 | 4,377.5                                  |
| Benzene                      | 301,039                                   | 2.21E-03           | 1.8E-02                 | 12.0                                     |
| Chloroform                   | 6,961                                     | 2.21E-03           | 2.1E-03                 | 0.0                                      |
| Ethylbenzene                 | 242,380                                   | 2.21E-03           | 1.4E-03                 | 0.7                                      |
| Methyl ethyl ketone          | 2,710,319                                 | 2.21E-03           | 2.2E-05                 | 0.1                                      |
| Methyl isobutyl ketone       | 1,055,425                                 | 2.21E-03           | 1.2E-04                 | 0.3                                      |
| Methylene chloride           | 5,392                                     | 2.21E-03           | 4.2E-04                 | 0.0                                      |
| Toluene                      | 454,692                                   | 2.21E-03           | 5.6E-03                 | 5.6                                      |
| m-Xylene                     | 230,905                                   | 2.21E-03           | 1.5E-03                 | 0.8                                      |
| o+p-Xylene                   | 246,181                                   | 2.21E-03           | 8.5E-03                 | 4.6                                      |
| Acenaphthene                 | 64,163                                    | 2.21E-03           | 2.5E-01                 | 35.5                                     |
| Acenaphthylene               | 54,951                                    | 2.21E-03           | 8.4E-03                 | 1.0                                      |
| Anthracene                   | 43,236                                    | 2.21E-03           | 2.5E+00                 | 238.9                                    |
| 2,3-Benzofluorene            | 20,038                                    | 2.21E-03           | 2.2E-01                 | 9.7                                      |
| Benzoic acid                 | 48,771                                    | 2.21E-03           | 3.3E-04                 | 0.0                                      |
| Biphenyl                     | 235,018                                   | 2.21E-03           | 3.7E-02                 | 19.2                                     |
| bis (2-Ethylhexyl) phthalate | 86,475                                    | 2.21E-03           | 1.1E-01                 | 21.0                                     |
| p-Cymene                     | 59,531                                    | 2.21E-03           | 4.3E-02                 | 5.7                                      |
| n-Decane                     | 5,811,283                                 | 2.21E-03           | 4.3E-03                 | 55.2                                     |
| 3,6-Dimethylphenanthrene     | 41,508                                    | 2.21E-03           | 4.7E-01                 | 43.1                                     |
| Di-n-octyl phthalate         | 57,969                                    | 2.21E-03           | 2.2E-01                 | 28.2                                     |
| n-Docosane                   | 294,904                                   | 2.21E-03           | 8.2E-05                 | 0.1                                      |
| n-Dodecane                   | 3,131,228                                 | 2.21E-03           | 4.3E-03                 | 29.8                                     |
| n-Eicosane                   | 906,896                                   | 2.21E-03           | 4.3E-03                 | 8.6                                      |
| Fluorene                     | 98,167                                    | 2.21E-03           | 7.0E-01                 | 151.9                                    |
| n-Hexacosane                 | 35,068                                    | 2.21E-03           | 8.2E-05                 | 0.0                                      |
| n-Hexadecane                 | 3,412,132                                 | 2.21E-03           | 4.3E-03                 | 32.4                                     |
| 1-Methylfluorene             | 85,877                                    | 2.21E-03           | 8.9E-02                 | 16.9                                     |
| 2-Methylnaphthalene          | 634,952                                   | 2.21E-03           | 1.8E-02                 | 25.3                                     |
| 1-Methylphenanthrene         | 193,224                                   | 2.21E-03           | 1.4E-01                 | 59.8                                     |
| Naphthalene                  | 6,356,997                                 | 2.21E-03           | 1.5E-02                 | 210.7                                    |
| n-Octacosane                 | 16,462                                    | 2.21E-03           | 8.2E-05                 | 0.0                                      |
| n-Octadecane                 | 1,749,875                                 | 2.21E-03           | 4.3E-03                 | 16.6                                     |
| Pentamethylbenzene           | 279,101                                   | 2.21E-03           | 2.9E-01                 | 178.9                                    |
| Phenanthrene                 | 148,958                                   | 2.21E-03           | 1.9E+01                 | 6,254.7                                  |
| Phenol                       | 17,640                                    | 2.21E-03           | 2.8E-02                 | 1.1                                      |

TABLE B-6 (continued)

**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**BARGE CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical            | Pollutants<br>Discharged<br>at Baseline<br>(grams) | Conversion Factors |                               | Pound<br>Equivalents<br>Discharged<br>at Baseline |
|---------------------|--|--------------------|-------------------------------|---|
|                     |  | Grams/<br>Pounds   | Toxic<br>Weighting<br>Factors |   |
| Pyrene              | 80,245   | 2.21E-03           | 7.5E-02                       | 13.3  |
| Styrene             | 15,452,374   | 2.21E-03           | 1.4E-02                       | 478.1   |
| n-Tetracosane       | 178,913  | 2.21E-03           | 8.2E-05                       | 0.0   |
| n-Tetradecane       | 5,997,603  | 2.21E-03           | 4.3E-03                       | 57.0  |
| Dalapon             | 1,110  | 2.21E-03           | 5.1E-03                       | 0.0   |
| Aluminum            | 2,075,445  | 2.21E-03           | 6.4E-02                       | 293.6   |
| Beryllium           | 165  | 2.21E-03           | 5.3E+00                       | 1.9   |
| Cadmium             | 6,008  | 2.21E-03           | 5.2E+00                       | 69.0  |
| Chromium            | 31,410   | 2.21E-03           | 2.7E-02                       | 1.9   |
| Copper              | 149,326  | 2.21E-03           | 4.7E-01                       | 155.1   |
| Hexavalent Chromium | 9,978  | 2.21E-03           | 5.1E-01                       | 11.2  |
| Iron                | 41,201,903   | 2.21E-03           | 5.6E-03                       | 509.9   |
| Lead                | 55,349   | 2.21E-03           | 1.8E+00                       | 220.2   |
| Manganese           | 334,530  | 2.21E-03           | 1.4E-02                       | 10.4  |
| Mercury             | 465  | 2.21E-03           | 5.0E+02                       | 514.0   |
| Molybdenum          | 60,115   | 2.21E-03           | 2.0E-01                       | 26.6  |
| Nickel              | 174,650  | 2.21E-03           | 3.6E-02                       | 13.9  |
| Tantalum            | 61,691   | 2.21E-03           | 6.0E-02                       | 8.2   |
| Titanium            | 3,581  | 2.21E-03           | 2.9E-02                       | 0.2   |
| Zinc                | 2,322,950  | 2.21E-03           | 5.1E-02                       | 261.8   |
| Zirconium           | 4,294  | 2.21E-03           | 5.4E-01                       | 5.1   |
| Fluoride            | 472,593  | 2.21E-03           | 3.5E-02                       | 36.6  |
| Total               | 103,622,849<br>(229,006 pounds)                    |                    |                               | 14,534.1  |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-7**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**BARGE CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                     | Pollutants Discharged at Baseline (grams) | Conversion Factors |                         |                     | Pound Equivalents Discharged at Baseline |
|------------------------------|---|--------------------|-------------------------|---------------------|--|
|                              |   | Grams/Pounds       | Toxic Weighting Factors | POTW Removal Factor |  |
| Acetone                      | 732,763                                   | 2.21E-03           | 7.60E-06                | 1.63E-01            | 0.0                                      |
| Acrylonitrile                | 769,974                                   | 2.21E-03           | 8.50E-01                | 5.00E-02            | 72.3                                     |
| Benzene                      | 81,054                                    | 2.21E-03           | 1.80E-02                | 5.24E-02            | 0.2                                      |
| Chloroform                   | 393                                       | 2.21E-03           | 2.10E-03                | 2.66E-01            | 0.0                                      |
| Ethylbenzene                 | 52,735                                    | 2.21E-03           | 1.40E-03                | 6.21E-02            | 0.0                                      |
| Methyl ethyl ketone          | 892,145                                   | 2.21E-03           | 2.20E-05                | 8.17E-02            | 0.0                                      |
| Methyl isobutyl ketone       | 352,791                                   | 2.21E-03           | 1.20E-04                | 1.21E-01            | 0.0                                      |
| Methylene chloride           | 1,648                                     | 2.21E-03           | 4.20E-04                | 4.57E-01            | 0.0                                      |
| Toluene                      | 121,776                                   | 2.21E-03           | 5.60E-03                | 3.82E-02            | 0.1                                      |
| m-Xylene                     | 37,109                                    | 2.21E-03           | 1.50E-03                | 3.46E-01            | 0.0                                      |
| o+p-Xylene                   | 24,029                                    | 2.21E-03           | 8.50E-03                | 4.93E-02            | 0.0                                      |
| Acenaphthene                 | 2,964                                     | 2.21E-03           | 2.50E-01                | 2.00E-02            | 0.0                                      |
| Acenaphthylene               | 2,472                                     | 2.21E-03           | 8.40E-03                | 5.00E-02            | 0.0                                      |
| Anthracene                   | 1,783                                     | 2.21E-03           | 2.50E+00                | 4.00E-02            | 0.4                                      |
| 2,3-Benzofluorene            | 1,135                                     | 2.21E-03           | 2.20E-01                | 3.00E-01            | 0.2                                      |
| Benzoic acid                 | 14,507                                    | 2.21E-03           | 3.30E-04                | 1.95E-01            | 0.0                                      |
| Biphenyl                     | 13,784                                    | 2.21E-03           | 3.70E-02                | 4.00E-02            | 0.0                                      |
| bis (2-Ethylhexyl) phthalate | 5,328                                     | 2.21E-03           | 1.10E-01                | 4.02E-01            | 0.5                                      |
| p-Cymene                     | 19,459                                    | 2.21E-03           | 4.30E-02                | 1.00E-02            | 0.0                                      |
| n-Decane                     | 332,346                                   | 2.21E-03           | 4.30E-03                | 9.10E-01            | 2.9                                      |
| 3,6-Dimethylphenanthrene     | 2,360                                     | 2.21E-03           | 4.70E-01                | 5.00E-02            | 0.1                                      |
| Di-n-octyl phthalate         | 3,302                                     | 2.21E-03           | 2.20E-01                | 1.70E-01            | 0.3                                      |
| n-Docosane                   | 17,033                                    | 2.21E-03           | 8.20E-05                | 1.20E-01            | 0.0                                      |
| n-Dodecane                   | 182,493                                   | 2.21E-03           | 4.30E-03                | 4.95E-02            | 0.1                                      |
| n-Eicosane                   | 52,717                                    | 2.21E-03           | 4.30E-03                | 7.60E-02            | 0.0                                      |
| Fluorene                     | 4,869                                     | 2.21E-03           | 7.00E-01                | 3.00E-01            | 2.3                                      |
| n-Hexacosane                 | 2,002                                     | 2.21E-03           | 8.20E-05                | 2.89E-01            | 0.0                                      |
| n-Hexadecane                 | 202,707                                   | 2.21E-03           | 4.30E-03                | 2.89E-01            | 0.6                                      |
| 1-Methylfluorene             | 4,863                                     | 2.21E-03           | 8.90E-02                | 3.00E-01            | 0.3                                      |
| 2-Methylnaphthalene          | 40,533                                    | 2.21E-03           | 1.80E-02                | 7.20E-01            | 1.2                                      |
| 1-Methylphenanthrene         | 10,948                                    | 2.21E-03           | 1.40E-01                | 5.00E-02            | 0.2                                      |
| Naphthalene                  | 405,285                                   | 2.21E-03           | 1.50E-02                | 5.31E-02            | 0.7                                      |
| n-Octacosane                 | 948                                       | 2.21E-03           | 8.20E-05                | 2.90E-01            | 0.0                                      |
| n-Octadecane                 | 101,357                                   | 2.21E-03           | 4.30E-03                | 2.89E-01            | 0.3                                      |
| Pentamethylbenzene           | 15,805                                    | 2.21E-03           | 2.90E-01                | 9.00E-02            | 0.9                                      |
| Phenanthrene                 | 7,712                                     | 2.21E-03           | 1.90E+01                | 5.00E-02            | 16.2                                     |
| Phenol                       | 4,633                                     | 2.21E-03           | 2.80E-02                | 5.00E-02            | 0.0                                      |
| Pyrene                       | 3,890                                     | 2.21E-03           | 7.50E-02                | 5.00E-02            | 0.0                                      |
| Styrene                      | 1,054,021                                 | 2.21E-03           | 1.40E-02                | 6.35E-02            | 2.1                                      |
| n-Tetracosane                | 10,152                                    | 2.21E-03           | 8.20E-05                | 2.89E-01            | 0.0                                      |
| n-Tetradecane                | 368,833                                   | 2.21E-03           | 4.30E-03                | 2.89E-01            | 1.0                                      |
| Dalapon                      | 182                                       | 2.21E-03           | 5.10E-03                | 1.00E+00            | 0.0                                      |
| Aluminum                     | 118,230                                   | 2.21E-03           | 6.40E-02                | 1.20E-01            | 2.0                                      |
| Beryllium                    | 9   | 2.21E-03           | 5.30E+00                | 5.40E-01            | 0.1                                      |
| Cadmium                      | 229                                       | 2.21E-03           | 5.20E+00                | 1.00E-01            | 0.3                                      |

TABLE B-7 (continued)

**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**BARGE CHEMICAL SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical            | Pollutants Discharged at Baseline (grams) | Conversion Factors |                         |                     | Pound Equivalents Discharged at Baseline |
|---------------------|---|--------------------|-------------------------|---------------------|--|
|                     |   | Grams/Pounds       | Toxic Weighting Factors | POTW Removal Factor |  |
| Chromium            | 1,682                                     | 2.21E-03           | 2.70E-02                | 3.30E-01            | 0.0                                      |
| Copper              | 5,296                                     | 2.21E-03           | 4.70E-01                | 1.60E-01            | 0.9                                      |
| Hexavalent Chromium | 1,772                                     | 2.21E-03           | 5.10E-01                | 9.40E-01            | 1.9                                      |
| Iron                | 2,312,045                                 | 2.21E-03           | 5.60E-03                | 1.70E-01            | 4.9                                      |
| Lead                | 2,556                                     | 2.21E-03           | 1.80E+00                | 8.00E-02            | 0.8                                      |
| Manganese           | 17,051                                    | 2.21E-03           | 1.40E-02                | 5.90E-01            | 0.3                                      |
| Mercury             | 27  | 2.21E-03           | 5.00E+02                | 4.00E-01            | 11.7                                     |
| Molybdenum          | 3,413                                     | 2.21E-03           | 2.00E-01                | 4.80E-01            | 0.7                                      |
| Nickel              | 8,537                                     | 2.21E-03           | 3.60E-02                | 4.90E-01            | 0.3                                      |
| Tantalum            | 3,520                                     | 2.21E-03           | 6.00E-02                | 4.50E-01            | 0.2                                      |
| Titanium            | 224                                       | 2.21E-03           | 2.90E-02                | 3.12E-01            | 0.0                                      |
| Zinc                | 125,694                                   | 2.21E-03           | 5.10E-02                | 2.20E-01            | 3.1                                      |
| Zirconium           | 247                                       | 2.21E-03           | 5.40E-01                | 1.00E+00            | 0.3                                      |
| Total               | 8,557,371<br>(18,912 pounds)              |                    |                         |                     | 130.4                                    |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-8**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**TRUCK PETROLEUM SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                         | Pollutants Discharged at Baseline (grams) | Conversion Factors |                         |                     | Pound Equivalents Discharged at Baseline |
|----------------------------------|---|--------------------|-------------------------|---------------------|--|
|                                  |   | Grams/Pounds       | Toxic Weighting Factors | POTW Removal Factor |  |
| Acetone                          | 364,973                                   | 2.21E-03           | 7.6E-06                 | 1.6E-01             | 0.0                                      |
| Benzene                          | 13,733                                    | 2.21E-03           | 1.8E-02                 | 5.0E-02             | 0.0                                      |
| 1,2-Dichloroethane               | 701                                       | 2.21E-03           | 6.2E-03                 | 1.1E-01             | 0.0                                      |
| Ethylbenzene                     | 10,254                                    | 2.21E-03           | 1.4E-03                 | 6.0E-02             | 0.0                                      |
| Methyl ethyl ketone              | 32,958                                    | 2.21E-03           | 2.2E-05                 | 8.0E-02             | 0.0                                      |
| Methyl isobutyl ketone           | 3,493                                     | 2.21E-03           | 1.2E-04                 | 1.2E-01             | 0.0                                      |
| Methylene chloride               | 2,226                                     | 2.21E-03           | 4.2E-04                 | 4.6E-01             | 0.0                                      |
| Tetrachloroethylene              | 961                                       | 2.21E-03           | 7.4E-02                 | 1.5E-01             | 0.0                                      |
| Toluene                          | 54,707                                    | 2.21E-03           | 5.6E-03                 | 4.0E-02             | 0.0                                      |
| 1,1,1-Trichloroethane            | 3,274                                     | 2.21E-03           | 4.3E-03                 | 1.0E-01             | 0.0                                      |
| Trichloroethylene                | 702                                       | 2.21E-03           | 6.3E-02                 | 1.3E-01             | 0.0                                      |
| Vinyl Acetate                    | 3,766                                     | 2.21E-03           | 4.0E-03                 | 1.0E+00             | 0.0                                      |
| m-Xylene                         | 16,445                                    | 2.21E-03           | 1.5E-03                 | 3.5E-01             | 0.0                                      |
| o+p-Xylene                       | 8,016                                     | 2.21E-03           | 8.5E-03                 | 5.0E-02             | 0.0                                      |
| Benzoic acid                     | 17,370                                    | 2.21E-03           | 3.3E-04                 | 1.9E-01             | 0.0                                      |
| Biphenyl                         | 385                                       | 2.21E-03           | 3.7E-02                 | 4.0E-02             | 0.0                                      |
| bis (2-Ethylhexyl) phthalate     | 103                                       | 2.21E-03           | 1.1E+01                 | 4.0E-01             | 1.0                                      |
| 4-Chloro-3-Methylphenol          | 17,578                                    | 2.21E-03           | 4.3E-03                 | 2.9E-01             | 0.0                                      |
| n-Decane                         | 46,633                                    | 2.21E-03           | 4.3E-03                 | 9.1E-01             | 0.4                                      |
| Diphenyl Ether                   | 11  | 2.21E-03           | 2.6E-02                 | 3.0E-01             | 0.0                                      |
| n-Docosane                       | 3,185                                     | 2.21E-03           | 8.2E-05                 | 1.2E-01             | 0.0                                      |
| n-Dodecane                       | 34,547                                    | 2.21E-03           | 4.3E-03                 | 5.0E-02             | 0.0                                      |
| n-Eicosane                       | 16,550                                    | 2.21E-03           | 4.3E-03                 | 8.0E-02             | 0.0                                      |
| n-Hexacosane                     | 3,235                                     | 2.21E-03           | 8.2E-05                 | 2.9E-01             | 0.0                                      |
| n-Hexadecane                     | 21,426                                    | 2.21E-03           | 4.3E-03                 | 2.9E-01             | 0.1                                      |
| Hexanoic Acid                    | 6,022                                     | 2.21E-03           | 3.4E-04                 | 1.6E-01             | 0.0                                      |
| 2-Isopropylnaphthalene           | 4,151                                     | 2.21E-03           | 9.8E-02                 | 7.2E-01             | 0.6                                      |
| 2-Methylnaphthalene              | 3,711                                     | 2.21E-03           | 1.8E-02                 | 7.2E-01             | 0.1                                      |
| Naphthalene                      | 3,513                                     | 2.21E-03           | 1.5E-02                 | 5.0E-02             | 0.0                                      |
| n-Octacosane                     | 2,259                                     | 2.21E-03           | 8.2E-05                 | 2.9E-01             | 0.0                                      |
| n-Octadecane                     | 7,248                                     | 2.21E-03           | 4.3E-03                 | 2.9E-01             | 0.0                                      |
| Pentamethylbenzene               | 3,909                                     | 2.21E-03           | 2.9E-01                 | 9.0E-02             | 0.2                                      |
| Phenol                           | 2,705                                     | 2.21E-03           | 2.8E-02                 | 5.0E-02             | 0.0                                      |
| n-Tetracosane                    | 3,445                                     | 2.21E-03           | 8.2E-05                 | 2.9E-01             | 0.0                                      |
| n-Tetradecane                    | 10,209                                    | 2.21E-03           | 4.3E-03                 | 2.9E-01             | 0.0                                      |
| n-Triacontane                    | 87  | 2.21E-03           | 8.2E-05                 | 2.9E-01             | 0.0                                      |
| Tripropylene glycol Methyl Ether | 113,949                                   | 2.21E-03           | 8.2E-06                 | 5.3E-01             | 0.0                                      |
| Aluminum                         | 13,642                                    | 2.21E-03           | 6.4E-02                 | 1.2E-01             | 0.2                                      |
| Antimony                         | 55  | 2.21E-03           | 1.9E-01                 | 4.4E-01             | 0.0                                      |
| Arsenic                          | 143                                       | 2.21E-03           | 4.0E+00                 | 1.0E+00             | 1.3                                      |
| Barium                           | 2,410                                     | 2.21E-03           | 2.0E-03                 | 6.4E-01             | 0.0                                      |
| Beryllium                        | 29  | 2.21E-03           | 5.3E+00                 | 5.4E-01             | 0.2                                      |
| Boron                            | 38,658                                    | 2.21E-03           | 1.8E-01                 | 7.7E-01             | 11.8                                     |
| Cadmium                          | 175                                       | 2.21E-03           | 5.2E+00                 | 1.0E-01             | 0.2                                      |
| Calcium                          | 107,780                                   | 2.21E-03           | 2.8E-05                 | 4.5E-01             | 0.0                                      |
| Chromium                         | 1,359                                     | 2.21E-03           | 2.7E-02                 | 3.3E-01             | 0.0                                      |

TABLE B-8 (continued)

**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**TRUCK PETROLEUM SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical            | Pollutants Discharged at Baseline (grams) | Conversion Factors |                         |                     | Pound Equivalents Discharged at Baseline |
|---------------------|---|--------------------|-------------------------|---------------------|--|
|                     |   | Grams/Pounds       | Toxic Weighting Factors | POTW Removal Factor |  |
| Cobalt              | 546                                       | 2.21E-03           | 1.1E-01                 | 6.3E-01             | 0.1                                      |
| Copper              | 11,839                                    | 2.21E-03           | 4.7E-01                 | 1.6E-01             | 2.0                                      |
| Hexavalent Chromium | 1,900                                     | 2.21E-03           | 5.1E-01                 | 9.4E-01             | 2.0                                      |
| Iron                | 160,398                                   | 2.21E-03           | 5.6E-03                 | 1.7E-01             | 0.3                                      |
| Lead                | 8,332                                     | 2.21E-03           | 1.8E+00                 | 8.0E-02             | 2.7                                      |
| Magnesium           | 39,177                                    | 2.21E-03           | 8.7E-04                 | 7.4E-01             | 0.1                                      |
| Manganese           | 4,160                                     | 2.21E-03           | 1.4E-02                 | 5.9E-01             | 0.1                                      |
| Mercury             | 2   | 2.21E-03           | 5.0E+02                 | 4.0E-01             | 0.7                                      |
| Molybdenum          | 1,429                                     | 2.21E-03           | 2.0E-01                 | 4.8E-01             | 0.3                                      |
| Nickel              | 42,143                                    | 2.21E-03           | 3.6E-02                 | 4.9E-01             | 1.6                                      |
| Phosphorus          | 2,360                                     | 2.21E-03           | 0.0E+00                 | 3.1E-01             | 0.0                                      |
| Potassium           | 4,901                                     | 2.21E-03           | 1.1E-03                 | 8.0E-01             | 0.0                                      |
| Selenium            | 18  | 2.21E-03           | 1.1E+00                 | 5.4E-01             | 0.0                                      |
| Silver              | 132                                       | 2.21E-03           | 4.7E-01                 | 2.2E-01             | 0.0                                      |
| Sodium              | 1,864,821                                 | 2.21E-03           | 5.5E-06                 | 4.5E-01             | 0.0                                      |
| Sulfur              | 6,314                                     | 2.21E-03           | 5.6E-06                 | 8.8E-01             | 0.0                                      |
| Tantalum            | 67  | 2.21E-03           | 6.0E-02                 | 4.5E-01             | 0.0                                      |
| Thallium            | 6   | 2.21E-03           | 1.4E-01                 | 7.3E-01             | 0.0                                      |
| Tin                 | 685                                       | 2.21E-03           | 3.0E-01                 | 3.5E-01             | 0.2                                      |
| Titanium            | 324                                       | 2.21E-03           | 2.9E-02                 | 3.1E-01             | 0.0                                      |
| Tungsten            | 181                                       | 2.21E-03           | 5.3E-03                 | 4.5E-01             | 0.0                                      |
| Vanadium            | 193                                       | 2.21E-03           | 6.2E-01                 | 5.7E-01             | 0.2                                      |
| Zinc                | 11,674                                    | 2.21E-03           | 5.1E-02                 | 2.2E-01             | 0.3                                      |
| Zirconium           | 11  | 2.21E-03           | 5.4E-01                 | 1.0E+00             | 0.0                                      |
| Fluoride            | 38,859                                    | 2.21E-03           | 3.5E-02                 | 3.9E-01             | 1.2                                      |
| Total Cyanide       | 48  | 2.21E-03           | 1.1E+00                 | 3.0E-01             | 0.0                                      |
| <br>                | <br>                                      | <br>               | <br>                    | <br>                | <br>                                     |
| Total               | 3,203,208<br>(7,079 pounds)               |                    |                         |                     | 28.2                                     |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-9**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**RAIL PETROLEUM SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical                        | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|---------------------------------|---|--------------------|------------------------|---------------------|--|
|                                 |   | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Acetone                         | 1,337                                     | 2.21E-03           | 7.6E-06                | 1.6E-01             | 0.0                                      |
| Benzene                         | 50  | 2.21E-03           | 1.8E-02                | 5.0E-02             | 0.0                                      |
| 1,2-Dichloroethane              | 3   | 2.21E-03           | 6.2E-03                | 1.1E-01             | 0.0                                      |
| Ethylbenzene                    | 38  | 2.21E-03           | 1.4E-03                | 6.0E-02             | 0.0                                      |
| Methyl ethyl ketone             | 121                                       | 2.21E-03           | 2.2E-05                | 8.0E-02             | 0.0                                      |
| Methyl isobutyl ketone          | 13  | 2.21E-03           | 1.2E-04                | 1.2E-01             | 0.0                                      |
| Methylene chloride              | 8   | 2.21E-03           | 4.2E-04                | 4.6E-01             | 0.0                                      |
| Tetrachloroethylene             | 4   | 2.21E-03           | 7.4E-02                | 1.5E-01             | 0.0                                      |
| Toluene                         | 200                                       | 2.21E-03           | 5.6E-03                | 4.0E-02             | 0.0                                      |
| 1,1,1-Trichloroethane           | 12  | 2.21E-03           | 4.3E-03                | 1.0E-01             | 0.0                                      |
| Trichloroethylene               | 3   | 2.21E-03           | 6.3E-02                | 1.3E-01             | 0.0                                      |
| Vinyl Acetate                   | 14  | 2.21E-03           | 4.0E-03                | 1.0E+00             | 0.0                                      |
| m-Xylene                        | 60  | 2.21E-03           | 1.5E-03                | 3.5E-01             | 0.0                                      |
| o+p-Xylene                      | 29  | 2.21E-03           | 8.5E-03                | 5.0E-02             | 0.0                                      |
| Benzoic acid                    | 64  | 2.21E-03           | 3.3E-04                | 1.9E-01             | 0.0                                      |
| Biphenyl                        | 1   | 2.21E-03           | 3.7E-02                | 4.0E-02             | 0.0                                      |
| bis (2-Ethylhexyl) phthalate    | 0   | 2.21E-03           | 1.1E+01                | 4.0E-01             | 0.0                                      |
| 4-Chloro-3-Methylphenol         | 64  | 2.21E-03           | 4.3E-03                | 2.9E-01             | 0.0                                      |
| n-Decane                        | 171                                       | 2.21E-03           | 4.3E-03                | 9.1E-01             | 0.0                                      |
| Diphenyl Ether                  | 0   | 2.21E-03           | 2.6E-02                | 3.0E-01             | 0.0                                      |
| n-Docosane                      | 12  | 2.21E-03           | 8.2E-05                | 1.2E-01             | 0.0                                      |
| n-Dodecane                      | 127                                       | 2.21E-03           | 4.3E-03                | 5.0E-02             | 0.0                                      |
| n-Eicosane                      | 61  | 2.21E-03           | 4.3E-03                | 8.0E-02             | 0.0                                      |
| n-Hexacosane                    | 12  | 2.21E-03           | 8.2E-05                | 2.9E-01             | 0.0                                      |
| n-Hexadecane                    | 78  | 2.21E-03           | 4.3E-03                | 2.9E-01             | 0.0                                      |
| Hexanoic Acid                   | 22  | 2.21E-03           | 3.4E-04                | 1.6E-01             | 0.0                                      |
| 2-Isopropynaphthalene           | 15  | 2.21E-03           | 9.8E-02                | 7.2E-01             | 0.0                                      |
| 2-Methylnaphthalene             | 14  | 2.21E-03           | 1.8E-02                | 7.2E-01             | 0.0                                      |
| Naphthalene                     | 13  | 2.21E-03           | 1.5E-02                | 5.0E-02             | 0.0                                      |
| n-Octacosane                    | 8   | 2.21E-03           | 8.2E-05                | 2.9E-01             | 0.0                                      |
| n-Octadecane                    | 27  | 2.21E-03           | 4.3E-03                | 2.9E-01             | 0.0                                      |
| Pentamethylbenzene              | 14  | 2.21E-03           | 2.9E-01                | 9.0E-02             | 0.0                                      |
| Phenol                          | 10  | 2.21E-03           | 2.8E-02                | 5.0E-02             | 0.0                                      |
| n-Tetracosane                   | 13  | 2.21E-03           | 8.2E-05                | 2.9E-01             | 0.0                                      |
| n-Tetradecane                   | 37  | 2.21E-03           | 4.3E-03                | 2.9E-01             | 0.0                                      |
| n-Triaccontane                  | 0   | 2.21E-03           | 8.2E-05                | 2.9E-01             | 0.0                                      |
| Tripropyleneglycol Methyl Ether | 417                                       | 2.21E-03           | 8.2E-06                | 5.3E-01             | 0.0                                      |
| Aluminum                        | 50  | 2.21E-03           | 6.4E-02                | 1.2E-01             | 0.0                                      |
| Antimony                        | 0   | 2.21E-03           | 1.9E-01                | 4.4E-01             | 0.0                                      |
| Arsenic                         | 1   | 2.21E-03           | 4.0E+00                | 1.0E+00             | 0.0                                      |
| Barium                          | 9   | 2.21E-03           | 2.0E-03                | 6.4E-01             | 0.0                                      |
| Beryllium                       | 0   | 2.21E-03           | 5.3E+00                | 5.4E-01             | 0.0                                      |
| Boron                           | 142                                       | 2.21E-03           | 1.8E-01                | 7.7E-01             | 0.0                                      |
| Cadmium                         | 1   | 2.21E-03           | 5.2E+00                | 1.0E-01             | 0.0                                      |
| Calcium                         | 395                                       | 2.21E-03           | 2.8E-05                | 4.5E-01             | 0.0                                      |
| Chromium                        | 5   | 2.21E-03           | 2.7E-02                | 3.3E-01             | 0.0                                      |

TABLE B-9 (continued)

**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**RAIL PETROLEUM SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical            | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|---------------------|---|--------------------|------------------------|---------------------|--|
|                     |   | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Cobalt              | 2   | 2.21E-03           | 1.1E-01                | 6.3E-01             | 0.0                                      |
| Copper              | 43  | 2.21E-03           | 4.7E-01                | 1.6E-01             | 0.0                                      |
| Hexavalent Chromium | 7   | 2.21E-03           | 5.1E-01                | 9.4E-01             | 0.0                                      |
| Iron                | 587                                       | 2.21E-03           | 5.6E-03                | 1.7E-01             | 0.0                                      |
| Lead                | 31  | 2.21E-03           | 1.8E+00                | 8.0E-02             | 0.0                                      |
| Magnesium           | 143                                       | 2.21E-03           | 8.7E-04                | 7.4E-01             | 0.0                                      |
| Manganese           | 15  | 2.21E-03           | 1.4E-02                | 5.9E-01             | 0.0                                      |
| Mercury             | 0   | 2.21E-03           | 5.0E+02                | 4.0E-01             | 0.0                                      |
| Molybdenum          | 5   | 2.21E-03           | 2.0E-01                | 4.8E-01             | 0.0                                      |
| Nickel              | 154                                       | 2.21E-03           | 3.6E-02                | 4.9E-01             | 0.0                                      |
| Phosphorus          | 9   | 2.21E-03           | 0.0E+00                | 3.1E-01             | 0.0                                      |
| Potassium           | 18  | 2.21E-03           | 1.1E-03                | 8.0E-01             | 0.0                                      |
| Selenium            | 0   | 2.21E-03           | 1.1E+00                | 5.4E-01             | 0.0                                      |
| Silver              | 0   | 2.21E-03           | 4.7E-01                | 2.2E-01             | 0.0                                      |
| Sodium              | 6,830                                     | 2.21E-03           | 5.5E-06                | 4.5E-01             | 0.0                                      |
| Sulfur              | 23  | 2.21E-03           | 5.6E-06                | 8.8E-01             | 0.0                                      |
| Tantalum            | 0   | 2.21E-03           | 6.0E-02                | 4.5E-01             | 0.0                                      |
| Thallium            | 0   | 2.21E-03           | 1.4E-01                | 7.3E-01             | 0.0                                      |
| Tin                 | 3   | 2.21E-03           | 3.0E-01                | 3.5E-01             | 0.0                                      |
| Titanium            | 1   | 2.21E-03           | 2.9E-02                | 3.1E-01             | 0.0                                      |
| Tungsten            | 1   | 2.21E-03           | 5.3E-03                | 4.5E-01             | 0.0                                      |
| Vanadium            | 1   | 2.21E-03           | 6.2E-01                | 5.7E-01             | 0.0                                      |
| Zinc                | 43  | 2.21E-03           | 5.1E-02                | 2.2E-01             | 0.0                                      |
| Zirconium           | 0   | 2.21E-03           | 5.4E-01                | 1.0E+00             | 0.0                                      |
| Fluoride            | 142                                       | 2.21E-03           | 3.5E-02                | 3.9E-01             | 0.0                                      |
| Total Cyanide       | 0   | 2.21E-03           | 1.1E+00                | 3.0E-01             | 0.0                                      |
| <br>Total           | <br>11,732<br>(26 pounds)                 |                    |                        |                     | 0.1                                      |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-10**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**TRUCK FOOD SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical      | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|---------------|---|--------------------|------------------------|---------------------|--|
|               |   | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Benzoic acid  | 2,072,555,307                             | 2.21E-03           | 3.30E-04               | 1.90E-01            | 287.2                                    |
| Hexanoic Acid | 48,273,877,828                            | 2.21E-03           | 3.40E-04               | 1.60E-01            | 5,803.7                                  |
| Phenol        | 213,127,187                               | 2.21E-03           | 2.80E-02               | 5.00E-02            | 659.4                                    |
| Total         | 50,559,560,322<br>(111,736,628 pounds)    |                    |                        |                     | 6,750.3                                  |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-11**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**RAIL FOOD SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical      | Pollutants Discharged at Baseline<br>(grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|---------------|--|--------------------|------------------------|---------------------|--|
|               |  | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Benzoic acid  | 594,567,143                                  | 2.21E-03           | 3.30E-04               | 1.90E-01            | 82.4                                     |
| Hexanoic Acid | 13,848,655,349                               | 2.21E-03           | 3.40E-04               | 1.60E-01            | 1,664.9                                  |
| Phenol        | 61,141,066                                   | 2.21E-03           | 2.80E-02               | 5.00E-02            | 189.2                                    |
| Total         | 14,504,363,558<br>(32,054,643 pounds)        |                    |                        |                     | 1,936.5                                  |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-12**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**BARGE FOOD SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical      | Pollutants Discharged at Baseline<br>(grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|---------------|--|--------------------|------------------------|---------------------|--|
|               |  | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Benzoic acid  | 3,937,080                                    | 2.21E-03           | 3.30E-04               | 1.90E-01            | 0.5                                      |
| Hexanoic Acid | 91,702,454                                   | 2.21E-03           | 3.40E-04               | 1.60E-01            | 11.0                                     |
| Phenol        | 404,861                                      | 2.21E-03           | 2.80E-02               | 5.00E-02            | 1.3                                      |
| Total         | 96,044,395<br>(212,258 pounds)               |                    |                        |                     | 12.8                                     |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-13**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**TRUCK HOPPER SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical  | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|-----------|---|--------------------|------------------------|---------------------|--|
|           |   | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Aluminum  | 74,225                                    | 2.21E-03           | 6.40E-02               | 1.20E-01            | 1.3                                      |
| Beryllium | 23  | 2.21E-03           | 5.30E+00               | 5.40E-01            | 0.1                                      |
| Calcium   | 1,356,462                                 | 2.21E-03           | 2.80E-05               | 4.50E-01            | 0.0                                      |
| Chromium  | 605                                       | 2.21E-03           | 2.70E-02               | 3.30E-01            | 0.0                                      |
| Iron      | 419,112                                   | 2.21E-03           | 5.60E-03               | 1.70E-01            | 0.9                                      |
| Manganese | 13,742                                    | 2.21E-03           | 1.40E-02               | 5.90E-01            | 0.3                                      |
| Titanium  | 2,174                                     | 2.21E-03           | 2.90E-02               | 3.10E-01            | 0.0                                      |
| Zinc      | 1,219                                     | 2.21E-03           | 5.10E-02               | 2.20E-01            | 0.0                                      |
| Total     | 1,867,563<br>(4,127 pounds)               |                    |                        |                     | 2.7                                      |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-14**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**RAIL HOPPER SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical  | Pollutants Discharged at Baseline<br>(grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|-----------|--|--------------------|------------------------|---------------------|--|
|           |  | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Aluminum  | 689  | 2.21E-03           | 6.40E-02               | 1.20E-01            | 0.0                                      |
| Beryllium | 0  | 2.21E-03           | 5.30E+00               | 5.40E-01            | 0.0                                      |
| Calcium   | 15,134                                       | 2.21E-03           | 2.80E-05               | 4.50E-01            | 0.0                                      |
| Chromium  | 11   | 2.21E-03           | 2.70E-02               | 3.30E-01            | 0.0                                      |
| Iron      | 3,644  | 2.21E-03           | 5.60E-03               | 1.70E-01            | 0.0                                      |
| Manganese | 132  | 2.21E-03           | 1.40E-02               | 5.90E-01            | 0.0                                      |
| Titanium  | 13   | 2.21E-03           | 2.90E-02               | 3.10E-01            | 0.0                                      |
| Zinc      | 13   | 2.21E-03           | 5.10E-02               | 2.20E-01            | 0.0                                      |
| Total     | 19,635<br>(43 pounds)                        |                    |                        |                     | 0.0                                      |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-15**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**BARGE HOPPER SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical  | Pollutants Discharged at Baseline<br>(grams) | Conversion Factors |                        | Pound Equivalents Discharged at Baseline |
|-----------|--|--------------------|------------------------|--|
|           |  | Grams/Pounds       | Toxic Weighting Factor |  |
| Aluminum  | 93,992                                       | 2.21E-03           | 6.40E-02               | 13.3                                     |
| Beryllium | 29   | 2.21E-03           | 5.30E+00               | 0.3                                      |
| Calcium   | 1,721,537                                    | 2.21E-03           | 2.80E-05               | 0.1                                      |
| Chromium  | 775  | 2.21E-03           | 2.70E-02               | 0.0                                      |
| Iron      | 530,356                                      | 2.21E-03           | 5.60E-03               | 6.6                                      |
| Manganese | 17,409                                       | 2.21E-03           | 1.40E-02               | 0.5                                      |
| Titanium  | 2,743  | 2.21E-03           | 2.90E-02               | 0.2                                      |
| Zinc      | 1,547  | 2.21E-03           | 5.10E-02               | 0.2                                      |
| Total     | 2,368,387<br>(5,234 pounds)                  |                    |                        | 21.2                                     |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.

**TABLE B-16**  
**BASELINE NONCONVENTIONAL POLLUTANT DISCHARGES**  
**BARGE HOPPER SUBCATEGORY**  
**INDIRECT DISCHARGERS**

| Chemical  | Pollutants Discharged at Baseline (grams) | Conversion Factors |                        |                     | Pound Equivalents Discharged at Baseline |
|-----------|---|--------------------|------------------------|---------------------|--|
|           |   | Grams/Pounds       | Toxic Weighting Factor | POTW Removal Factor |  |
| Aluminum  | 22,992                                    | 2.21E-03           | 6.40E-02               | 1.20E-01            | 0.4                                      |
| Beryllium | 4   | 2.21E-03           | 5.30E+00               | 5.40E-01            | 0.0                                      |
| Calcium   | 505,338                                   | 2.21E-03           | 2.80E-05               | 4.50E-01            | 0.0                                      |
| Chromium  | 333                                       | 2.21E-03           | 2.70E-02               | 3.30E-01            | 0.0                                      |
| Iron      | 121,664                                   | 2.21E-03           | 5.60E-03               | 1.70E-01            | 0.3                                      |
| Manganese | 4,416                                     | 2.21E-03           | 1.40E-02               | 5.90E-01            | 0.1                                      |
| Titanium  | 442                                       | 2.21E-03           | 2.90E-02               | 3.10E-01            | 0.0                                      |
| Zinc      | 441                                       | 2.21E-03           | 5.10E-02               | 2.20E-01            | 0.0                                      |
| Total     | 655,629<br>(1,449 pounds)                 |                    |                        |                     | 0.8                                      |

Note: Pound Equivalent Discharges are rounded to the nearest 0.1 pounds.



## **APPENDIX C**

### **SUPPORTING DOCUMENTATION FOR COST-EFFECTIVENESS ANALYSIS: CONVENTIONAL POLLUTANT REMOVALS**



TABLE C-1

**CONVENTIONAL POLLUTANT REMOVALS**  
**TRUCK CHEMICAL SUBCATEGORIES**  
**DIRECT DISCHARGERS**

| Chemical                        | Pollutants Removed<br>(grams) | Conversion Factor | Pollutants Removed<br>(pounds) |
|---------------------------------|-------------------------------|-------------------|--------------------------------|
|                                 | Option 1                      | Grams/Pounds      | Option 1                       |
| 5-Day Biochemical Oxygen Demand | ND                            | 2.21E-03          | ND                             |
| Total Suspended Solids          | ND                            | 2.21E-03          | ND                             |
| Oil and Grease                  | ND                            | 2.21E-03          | ND                             |
| <br>                            |                               |                   |                                |
| Total                           | ND                            |                   | ND                             |

ND: Not disclosed due to business confidentiality.

TABLE C-2

**CONVENTIONAL POLLUTANT REMOVALS**  
**RAIL CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical                        | Pollutants Removed<br>(grams) |           |           | Conversion Factor<br>(pounds) | Pollutants Removed<br>(pounds) |           |           |
|---------------------------------|-------------------------------|-----------|-----------|-------------------------------|--------------------------------|-----------|-----------|
|                                 | Option 1                      | Option 2  | Option 3  |                               | Option 1                       | Option 2  | Option 3  |
| 5-Day Biochemical Oxygen Demand | ND                            | ND        | ND        | 2.21E-03                      | ND                             | ND        | ND        |
| Total Suspended Solids          | ND                            | ND        | ND        | 2.21E-03                      | ND                             | ND        | ND        |
| Oil and Grease                  | ND                            | ND        | ND        | 2.21E-03                      | ND                             | ND        | ND        |
| <b>Total</b>                    | <b>ND</b>                     | <b>ND</b> | <b>ND</b> |                               | <b>ND</b>                      | <b>ND</b> | <b>ND</b> |

ND: Not disclosed due to business confidentiality.

TABLE C-3

**CONVENTIONAL POLLUTANT REMOVALS  
BARGE CHEMICAL SUBCATEGORY  
DIRECT DISCHARGERS**

| Chemical                        | Pollutants Removed<br>(grams) |                      | Conversion Factor | Pollutants Removed<br>(pounds) |                  |
|---------------------------------|-------------------------------|----------------------|-------------------|--------------------------------|------------------|
|                                 | Option 1                      | Option 2             |                   | Grams/Pounds                   | Option 1         |
| 5-Day Biochemical Oxygen Demand | 222,484,929                   | 273,899,313          | 2.21E-03          | 491,692                        | 605,317          |
| Total Suspended Solids          | 340,842,409                   | 390,291,354          | 2.21E-03          | 753,262                        | 862,544          |
| Oil and Grease                  | 2,311,473,304                 | 2,312,344,711        | 2.21E-03          | 5,108,356                      | 5,110,282        |
| <b>Total</b>                    | <b>2,874,800,641</b>          | <b>2,976,535,377</b> |                   | <b>6,353,309</b>               | <b>6,578,143</b> |

**TABLE C-4**

**CONVENTIONAL POLLUTANT REMOVALS  
BARGE HOPPER SUBCATEGORY  
DIRECT DISCHARGERS**

| Chemical               | Pollutants Removed<br>(grams) | Conversion Factor | Pollutants Removed<br>(pounds) |
|------------------------|-------------------------------|-------------------|--------------------------------|
|                        | Option 1                      |                   | Grams/Pounds                   |
| Total Suspended Solids | 3,903,193                     | 2.21E-03          | 8,626                          |
| Total                  | 3,903,193                     |                   | 8,626                          |

**APPENDIX D**

**SUPPORTING DOCUMENTATION FOR  
COST-EFFECTIVENESS ANALYSIS:  
BASELINE CONVENTIONAL POLLUTANT DISCHARGES**



**TABLE D-1**

**BASELINE CONVENTIONAL POLLUTANT DISCHARGES  
TRUCK CHEMICAL SUBCATEGORY  
DIRECT DISCHARGERS**

| Chemical                        | Pollutants Discharged<br>at Baseline (grams) | Grams/Pounds<br>Conversion Factor | Pollutants Discharged<br>at Baseline (pounds) |
|---------------------------------|--|-----------------------------------|---|
| 5-Day Biochemical Oxygen Demand | 425,538                                      | 2.21E-03                          | 940   |
| Total Suspended Solids          | 1,567,047                                    | 2.21E-03                          | 3,463   |
| Oil and Grease                  | 110,586,227                                  | 2.21E-03                          | 244,396                                       |
| <br>                            |  |                                   |   |
| Total                           | 112,578,812                                  |                                   | 248,799                                       |

**TABLE D-2**

**BASELINE CONVENTIONAL POLLUTANT DISCHARGES  
RAIL CHEMICAL SUBCATEGORY  
DIRECT DISCHARGERS**

| Chemical                        | Pollutants Discharged<br>at Baseline (grams) | Grams/Pounds<br>Conversion Factor | Pollutants Discharged<br>at Baseline (pounds) |
|---------------------------------|--|-----------------------------------|---|
| 5-Day Biochemical Oxygen Demand | 185,055                                      | 2.21E-03                          | 409   |
| Total Suspended Solids          | 1,096,079                                    | 2.21E-03                          | 2,422   |
| Oil and Grease                  | 288,134                                      | 2.21E-03                          | 637   |
| <b>Total</b>                    | <b>1,569,268</b>                             |                                   | <b>3,468</b>                                  |

TABLE D-3

**BASELINE CONVENTIONAL POLLUTANT DISCHARGES**  
**BARGE CHEMICAL SUBCATEGORY**  
**DIRECT DISCHARGERS**

| Chemical                        | Pollutants Discharged<br>at Baseline (grams) | Grams/Pounds<br>Conversion Factor | Pollutants Discharged<br>at Baseline (pounds) |
|---------------------------------|--|-----------------------------------|---|
| 5-Day Biochemical Oxygen Demand | 276,953,881                                  | 2.21E-03                          | 612,068                                       |
| Total Suspended Solids          | 391,267,814                                  | 2.21E-03                          | 864,702                                       |
| Oil and Grease                  | 2,313,256,074                                | 2.21E-03                          | 5,112,296                                     |
| <br>                            |  |                                   |   |
| Total                           | 2,981,477,768                                |                                   | 6,589,066                                     |

**TABLE D-4**

**BASELINE CONVENTIONAL POLLUTANT DISCHARGES  
BARGE HOPPER SUBCATEGORY  
DIRECT DISCHARGERS**

| <u>Chemical</u>        | <u>Pollutants Discharged<br/>at Baseline (grams)</u> | <u>Grams/Pounds<br/>Conversion Factor</u> | <u>Pollutants Discharged<br/>at Baseline (pounds)</u> |
|------------------------|--|---|---|
| Total Suspended Solids | 8,573,754  | 2.21E-03                                  | 18,948  |
| Total                  | 8,573,754  |   | 18,948  |